

IV. ENVIRONMENTAL CONSEQUENCES

The purpose of this chapter is to describe the anticipated social/economic, agricultural resource, natural resource, and other effects of the proposed highway. Where appropriate, the text contrasts the proposed highway with the No-Action Alternative. In general, however, the No-Action Alternative would have no impact on the natural and man-made environment of the project area.

The chapter is divided into topical discussions in a manner similar to Chapter II, "Affected Environment." These sections address the following issues:

- General Impacts (beginning on page IV-1)
- Social/Economic (beginning on page IV-3)
- Agricultural (beginning on page IV-12)
- Cultural (beginning on page IV-22)
- Air Quality (beginning on page IV-23)
- Noise (beginning on page IV-23)
- Energy (beginning on page IV-31)
- Natural Resource Impacts (beginning on page IV-31)
- Water Quality/Resources Impacts (beginning on page IV-41)
- Flood Plain Impacts (beginning on page IV-45)
- Wetland Impacts (beginning on page IV-47)
- Hazardous and Non-Hazardous Wastes (beginning on page IV-52)
- Permits/Certifications (beginning on page IV-53)
- Visual Impacts (beginning on page IV-54)
- Secondary and Cumulative Impacts (beginning on page IV-56)
- Construction Impacts (beginning on page IV-59)
- Summary of Mitigation Measures (beginning on page IV-61)

In order to identify the location of specific impacts, the text occasionally refers to "station" numbers. Exhibit II-2 (all sheets) and Exhibit II-3 (all sheets) show these station numbers along the design of the proposed alignment. The station numbers indicate roadway length in meters. For example, the distance between design stations 100+500 and 101+000 is 500 meters or 1,640 feet.

IV.A GENERAL IMPACTS

IV.A.1 Short-Term Uses Versus Long-term Productivity

This section describes a range of direct, secondary, and cumulative impact analyses that identify the uses of man's environment by the proposed highway and associated secondary actions and their relationship to the long-term productivity of that environment. Long-term productivity is defined in two ways. It is first defined by the three purposes of the project, transportation system linkage, reduction of congestion in downtown Macomb, and economic development. Second, natural resource preservation and agricultural resource preservation goals contained in state and federal legislation also define long-term productivity.

The proposed highway would be consistent with the maintenance and enhancement of long-term productivity for McDonough County and west central Illinois in the following ways:

- *Transportation System Linkage* – The proposed highway would provide a final link between other four-lane expressway improvements that are either existing, under construction, or proposed in west central Illinois.
- *Reduce Congestion in Downtown Macomb* – The proposed highway would reduce downtown Macomb traffic and congestion, reduce through truck traffic in Macomb, and reduce travel time for travelers that do not originate or end their trips in Macomb.
- *Economic Development* – The proposed highway would support the City of Macomb's economic development strategy.

The proposed highway would not be consistent with the maintenance and enhancement of long-term productivity for McDonough County and west central Illinois in the following ways:

- *Agricultural Land Loss and Limits on Use* – Construction of the proposed highway would require **243.0** hectares (**600.5** acres) of farmland. In addition to land actually needed for the roadway itself, **44.7** hectares (**110.4** acres) of agricultural land would be land-locked and 3.6 hectares (8.8 acres) would become uneconomic remnants. The proposed highway would bisect 24 farm units, either laterally or diagonally. Seven of these units would experience adverse travel. To mitigate for woodland and prairie impacts, a 59.7-hectare (147.4-acre) mitigation site has been purchased and is shown on Exhibit II-3d. Approximately 1.42 hectares (3.51 acres) of this site is in either pasture or cropland. The remainder is woodland.

Several management and design practices were and would continue to be incorporated into the proposed highway to help minimize disruptions to agricultural activities and help limit adverse impacts to designated soils. The proposed highway would parallel property lines where possible to minimize severances and maintain access to farm fields. The project design would maintain existing surface and subsurface drainage. Contractors will be required to implement sedimentation and erosion control measures to minimize loss of topsoil into streams and roadside ditches. They would maintain proper field drainage during construction.

- *Natural Resource Use* – The proposed highway would change **262.0** hectares (**647.3** acres) of various cover types. These numbers include cover type impacts by road construction in the project's right-of-way and conversion/gain in mitigation areas. The greatest natural plant community impact would involve upland forest (approximately **30.8** hectares or **76.1** acres). The proposed highway would affect wildlife corridors. Disruption to these corridors would be mitigated by a series of animal underpasses.

The proposed highway would include mitigation for wildlife habitat loss through minimization of habitat loss, as well as habitat creation. Early mitigation planning indicates that through plantings in the right-of-way and on additional lands purchased, the following habitat mitigation would occur:

- 35.5 hectares (87.6 acres) – prairie restoration.
- **14.0** hectares (**34.6** acres) – forest restoration.
- **60.8** hectares (**150.3** acres) – upland forest protected from grazing and development.

- 14.0 hectares (34.8 acres) – floodplain forest protected from grazing and development.
- 1.3 hectares (3.2 acres) – wetland protected from grazing and development.

The proposed highway would affect five wetlands, with a total wetland impact of **0.76** hectare (**1.87** acres). Wetland impacts would be compensated through the development of both forested and non-forested wetland.

The proposed highway also would result in impacts to the rural community through which it would pass. It would not sever or pass through any subdivisions or urban neighborhoods. The project would retain existing rural circulation routes. The project would affect individual or smaller clusters of homes and agricultural operations. It would relocate the households in seven homes (all farm-related), as well as one business. In 2020, noise levels would be 66 dBA or greater at five residences. Substantial increases (greater than 14 dBA above existing levels) would occur at **ten** residences. Both impact types would occur at one additional residence, for a total of **16** residences that would be affected by future traffic noise from the proposed highway. Abatement studies found that available options for reducing noise levels at these homes are not feasible and/or economically reasonable. A new frontage road would be placed behind four residences at the northeast quadrant of the proposed interchange with US 67, reducing the privacy of residents.

IV.A.2 Irreversible/Irretrievable Commitment of Resources

Implementation of the proposed highway would involve commitment of a range of natural, physical, human, and fiscal resources. Land used in the construction of the proposed highway is an irreversible commitment. Although the land used could be converted to another use in the future, there is no reason to believe such a conversion would ever be necessary or desirable. Restoring altered natural resources would be difficult.

Construction of the proposed highway would expend considerable amounts of fossil fuels, labor, and highway/bridge construction materials. Additionally, the proposed highway would use large amounts of labor and natural resources in the fabrication and preparation of construction materials. These materials are generally not retrievable. They are not, however, in short supply, and their use would not have an adverse effect on continued availability of these resources.

The construction of the proposed highway also could require a substantial one-time expenditure of both State and Federal funds.

The commitment of these resources is based on the concept that residents of the City of Macomb, McDonough County, and west central Illinois would benefit overall by improving the transportation system of the area. These benefits would include reduced travel time and cost to other parts of Illinois and reduced congestion in downtown Macomb. The No-Action Alternative would require only materials, labor, and natural resources to maintain the facility.

IV.B SOCIAL/ECONOMIC

This section describes the proposed highway's social and economic impacts. It addresses: community changes, environmental justice (the potential for affecting low income and minority populations), the potential for affecting other social groups, impacts to public facilities and services, relocation of homes and businesses, other business impacts, induced growth and

land use plan compatibility, property values, transportation impacts, impacts to industrial sites, employment impacts, and tax revenue impacts.

The proposed highway would pass through a primarily rural area. As such it would not sever or pass through any subdivisions or urban neighborhoods. The project would affect individual or smaller clusters of homes and agricultural operations. There are no concentrations of low income households or any minority group within the project corridor. There are higher concentrations of the elderly in the corridor than McDonough County as a whole. The project would retain existing rural circulation routes. Thus, it would not affect travel routes to schools, churches, parks, hospitals, shopping, and community services. The project would not affect any community facilities or services. Construction of the proposed alignment would require the relocation of some utilities in the project area. **Six** residential relocations and one business relocation would result from the proposed alignment.

Because traffic volumes on US 67 and US 136 through Macomb are expected to continue to increase even with the completion of the proposed highway (for example, the ADT on US 136 west of downtown is projected to increase from 12,800 vpd in 2000 to 17,400 vpd in 2025 even with the proposed highway), the resulting travel pattern changes are not expected to have a large influence on the existing business community. To the extent that the proposed highway serves as a catalyst to attract new industrial employers and their employees to the area, it could have a positive influence on the economic base of the area. The proposed highway could accelerate current development trends. It would support current land use plans and economic development strategies for the area. Construction of the proposed highway would result in the creation of temporary construction-related jobs. Purchase of the right-of-way for the project would temporarily reduce tax revenues in the project area's taxing districts by less than one percent.

IV.B.1 Community Changes

The proposed highway would pass through a primarily rural area. As such it would not sever or pass through any subdivisions or urban neighborhoods. The project would retain existing rural circulation routes. The project would affect individual or smaller clusters of homes and agricultural operations. The following sections address these impacts: Relocation (Section IV.B.5), Agricultural (Section IV.C), Severances, Remnants, and Land-locked Parcels, (Section IV.C.4), Noise (Section IV.F), and Visual Impacts (Section IV.N). These sections identify one business and **six** residential relocations. **Eleven** outbuildings are identified with the **six** residential relocations. The proposed alignment would bisect 24 farm units, either laterally or diagonally, thereby dividing a parcel of land into two or more individual plots. It would sever two of the 24 farm units twice. With the proposed alignment, noise levels would be 66 dBA or greater at five residences. Substantial increases (greater than 14 dBA above existing levels) would occur at **ten** residences. Both impact types would occur at one additional residence, for a total of **16** residences that would be affected by traffic noise. Abatement studies found that available options for reducing noise levels at these homes are not feasible and/or economically reasonable.

In addition to the **six** displacements, a new frontage road would affect four residences at the northeast quadrant of the proposed interchange with US 67. The residences are immediately adjacent to the interchange and their access to US 67 must be moved to a safe distance from interchange ramps. The proposed alignment would place the frontage road behind the homes. Roads would surround the four homes. This feature would reduce the privacy of residents.

During the public involvement program, various neighborhood groups on the western segment of the proposed highway expressed concerns that the project could have adverse visual effects on

their subdivisions. Because of the concern, the study team moved the alignment of the proposed highway west to avoid impacts to these subdivisions.

With the proposed highway, the City of Macomb and nearby communities would gain better roadway access to the regional roadway system. The proposed highway would support the economic development goals of the area. The proposed highway could reduce traffic through downtown Macomb by as much as 28 percent. Also, truck traffic passing through town would be reduced. The reduction in truck traffic through town could be as high as 36 percent.

IV.B.2 Environmental Justice

As documented in Section II.A.1 under “Racial and Ethnic Characteristics,” there are no concentrations of minority or low-income populations within the project corridor. The 1999 median family income (MFI) for the block groups in the project corridor was higher than the MFI for McDonough County or the City of Macomb. The percent of 2000 households below the poverty level was lower for the block groups in the project corridor than for McDonough County or the City of Macomb. Based on these statistics and field observations, there are no groups of low-income populations within the project area. Therefore, the proposed project would not cause disproportionately adverse impacts to minority or low-income populations.

IV.B.3 Other Groups

As described in Section II.A.1 under “Elderly and General Age Characteristics” since 1980, the number of elderly people living on farms within McDonough County has steadily increased. The majority of these people are aging in place, rather than migrating to the County from elsewhere. The 2000 US Census block groups that contain the project corridor have a higher percentage of elderly than McDonough County as a whole. Thus, based on these data and conversations with affected residents during the public involvement program, it is expected that households containing elderly members would be affected by the impacts described above in Section IV.B.1. As noted in that section, the proposed alignment would not sever local roads. Thus, the proposed alignment would not affect travel routes of the elderly, school-age children, pedestrians, and bicyclists to schools, churches, parks, hospitals, shopping, and community services.

IV.B.4 Public Services/Facilities

Service Availability

No public facilities or community services facilities are within the project area. Since the project would retain local roads, it would not negatively affect the response time or travel distance of emergency services. The project would also not negatively affect school bus routes. Emergency service and school bus operations would benefit from reduced future traffic volumes and associated congestion in downtown Macomb.

The City of Macomb's Comprehensive Plan and the Overall Economic Development Program for McDonough County identify the completion of an improved regional highway network as essential to the economic growth of the City of Macomb, McDonough County, and the surrounding region. Thus, the City and County expect and hope that the proposed highway would encourage economic development in the area. As described in Section II.A.2, the City has taken other actions to encourage economic development. Since the City and County consider additional development desirable, there is no reason to believe that they would be unable to provide the new public services and facilities to support this development and meet community needs.

Utility Impacts/Relocations

Construction of the proposed alignment would affect the facilities of several utilities in the project area. The owners of the affected utilities would relocate aerial utilities, and relocate, lower, or encase buried utilities. Utility adjustment and relocation costs are included in the cost estimates for the proposed alignment. The IDOT would reimburse utilities for relocation costs in accordance with the IDOT's current accommodation policy.

During the design phase, the IDOT would contact each municipality and utility company to coordinate provisions for the relocation, adjustment, or extension of their facilities, as needed to accommodate the proposed alignment. Coordination of construction of the proposed alignment with any planned service extensions would be sought in order to minimize traffic interruptions, and minimize damage and repair to newly constructed pavements.

IV.B.5 Relocation

Six residential relocations and one business relocation would result from the proposed alignment. The IDOT would implement the provisions of the *State of Illinois Relocation Assistance Plan* in accordance with the Uniform Relocation Assistance and Real Property Acquisition Act of 1970 (URARPA), as amended.

Residential

The proposed alignment would require the relocation of **six** residences. **Five** of the relocations are farm residences.

The IDOT would offer relocation assistance, in accordance with Federal and State policies, to all occupants of buildings they would purchase and remove. Those policies provide for relocation assistance services for both homeowners and renters. Participation under the State and Federal policies is without discrimination. The IDOT would pay property owners fair market value for all private property purchased.

Discussions with representatives of the Macomb Area Chamber of Commerce and local real estate agents found that there is an ample supply of housing in the area that is comparable in size, quality, and price to housing that would be lost. Displaced residents would be given the opportunity to relocate in the same area if they desire.

There is no Section 8 housing or other public subsidized housing affected by the proposed alignment.

Commercial

The proposed alignment would displace one business. It is a farm and garden implement business at the east terminus of the proposed alignment. The business employs less than ten people. The business consists of a gravel lot and a prefabricated building with limited office facilities. Although there is limited availability of comparable facilities in the area, there are sites readily available where a prefabricated structure could be relocated or replaced.

Relocation assistance and compensation would be provided to any business displaced as a result of the proposed alignment, in accordance with applicable State and Federal regulations and guidelines.

IV.B.6 Business Impacts

The proposed alignment would require the purchase of some land from Smith Airfield. The project would move access to the airfield from US 67 to US 136/US 67 east of the proposed interchange. The project would not require the purchase of land or change/control access for any other commercial businesses in the project area. The primary business the project would directly affect is agriculture. Section IV.C addresses agricultural impacts.

Traffic would be diverted to the proposed highway that would have passed by and perhaps stopped at businesses along the existing roads, including downtown Macomb. Along US 136 inside the proposed highway, there are 27 businesses dependent on exposure to vehicles passing their location to generate a portion of their sales. These businesses include gas stations, motels, auto dealerships, entertainment related businesses, quick-stop auto care facilities, and car washes. There are 87 other businesses along this corridor that are not dependent, or that are very minimally dependent on impulse stops by passing traffic. These include medical, financial, and other professional services, government services, car repair, and retail businesses such as grocery and building supply stores. These businesses are destination businesses; a customer drives to that business to purchase a specific, needed service or product. On US 67 inside the proposed highway, there are 11 traffic dependent businesses and 21 destination businesses. On US 67/US 136 inside the proposed highway there are 26 traffic dependent businesses and 54 destination businesses. The number of traffic dependent businesses along existing US 67 and US 136 total 64.

Businesses that are traffic dependent would have reduced exposure to potential customers if the proposed highway is built. Traffic volumes through downtown Macomb would be less in 2020 with the proposed highway than with the No-Action Alternative. However, traffic would be greater than it is today, with either alternative.

As discussed below in Section IV.B.7, "Potential to Induce Growth," the Macomb Chamber of Commerce and the Macomb Area Industrial Development Corporation expect commercial development to continue near the eastern and western ends of the proposed alignment. Development likely could be influenced, and it would likely include highway-related development. Although this is the continuation of an existing trend, businesses attracted to the interchanges of the proposed alignment would draw customers from throughout Macomb. Thus, the shopping patterns of consumers in the area could change with the proposed highway. As through travelers, the types of goods and services bypass travelers demand would be limited. Thus, the proposed highway should not have a large influence on the business community from the perspective of travel pattern change.

The proposed highway would improve access to the regional transportation system and the interstate highway system for industrial, manufacturing and wholesale businesses, facilitating the movement of goods and services.

IV.B.7 Land Use Impacts

This section focuses on the potential for the proposed highway to induce development and its compatibility with area comprehensive and economic development plans. The project's affect on existing land use is discussed in Section IV.B.1, "Community Changes;" Section IV.B.5, "Relocation;" Section IV.C, "Agricultural;" Section IV.F, "Noise;" and Section IV.N, "Visual Impacts."

Potential to Induce Growth

Telephone communications with the Macomb Community Development Coordinator, the Macomb Chamber of Commerce, the Macomb Area Industrial Development Corporation, and the Macomb Downtown Development Corporation revealed that no developments are currently planned whose implementation is dependent on the proposed highway. It is, however, reasonable to assume that commercial, industrial and residential development trends would continue in and around the proposed highway. The proposed highway would likely support this development. Since the population of McDonough County has declined since 1990, any increases in population and employment in the county are not expected to be dramatic.

The Macomb Chamber of Commerce and the Macomb Area Industrial Development Corporation expect commercial development to continue near the eastern and western ends of the proposed alignment. This trend would likely continue with implementation of the proposed highway. As identified in Section II.A.2, the development along East Jackson Street (US 136/US 67) is primarily retail. A Burger King restaurant and a Hy-Vee grocery store were constructed near to the intersection of US 136 and US 67. The existing Wal-Mart Store on East Jackson is presently expanding (May 2003). Two local businessmen have purchased property near the intersection. Initial development plans call for commercial land use. Development may benefit from the proposed highway, and could extend beyond its current limits at US 67.

Similarly, the proposed highway could encourage commercial development near the western segment of the project. This would include highway-related development that would serve travelers on the bypass and the new residential areas west of Macomb. Non-highway-oriented commercial development also is likely to increase in this area to service new residential areas west of Macomb. Commercial development to service residential areas is likely to occur whether or not the IDOT implements the proposed highway.

Residential development would continue in the northwestern and western portions of the project area. An apartment complex off Wigwam Hollow Road near US 136 is currently under construction. A local developer is developing a new residential subdivision along West Adams Road near the existing residential developments of Heath Court and Rye Court. Land for the Deer Ridge subdivision has been platted, 2 properties sold and one home constructed. Since this area is attractive for residential development because of its woodlands, varying topography, and other features, development would continue to occur with or without the proposed highway. Implementation of the proposed highway could accelerate or increase this trend only to the extent that the project acts as a catalyst to attract jobs and thus increase the demand for new housing.

New residential and business growth is not presently occurring north of Macomb near the proposed US 67 interchange. This location contains flat farmland and lacks the desirable land features for residential development that occur west of Macomb. The focus of new commercial and industrial development is at the proposed US 136/US 67 interchange on the east side of Macomb, both in terms of planning policy and what is presently occurring. The interchange at US 67 is not likely to be a feature that is sufficiently attractive to counter the characteristics that make currently developing areas east and west of Macomb attractive and thereby shift substantial new development to this area.

Land Use and Economic Development Plans

The City of Macomb and McDonough County have indicated their desire for a bypass to aid in promoting economic development in the region. The Illinois Institute for Rural Affairs, along with the City of Macomb and McDonough County indicated in a Strategic Visioning and Planning Workshop in 1998 that an improved highway transportation system, including a bypass, was an

important part of a strategy to promote economic growth for the region. The proposed highway would support this strategy.

Goals developed by the *Overall Economic Development Program* in 1980 and 1981 and revised in 1984 pointed to an improved transportation system as an important factor in economic development for McDonough County. Similarly, the *Macomb, Illinois Comprehensive Plan* of 1989 established an objective to promote an improved multi-modal transportation program to satisfy the needs of industry, business and citizens. The proposed highway would support the goals and objects of these plans.

The proposed highway also would support the objectives of the Tax Increment Financing District established by the City for the downtown core. The proposed highway would support the goals of the Macomb Downtown Development Corporation by reducing truck traffic and congestion delays in the downtown core.

The proposed highway would facilitate access to the Macomb/McDonough County, Illinois Enterprise Zone, established to promote industrial development within the City and nearby areas of McDonough County. It would support the economic development goals of the Macomb Area Industrial Development Corporation, which oversees the Enterprise Zone.

The proposed highway would not affect the proposed expansion of the Macomb Municipal Airport.

IV.B.8 Property Values

The proposed highway could affect property values of homes in close proximity to it. Changes that could affect the desirability of homes and therefore value are increased noise levels, the introduction of the project into views from homes, and changes in access. The proposed highway generally would have few changes in access to homes or businesses. A new frontage road would affect four residences at the northeast quadrant of the proposed interchange with US 67. The proposed alignment would place a new frontage road behind the homes. Roads would surround the four homes. This feature would reduce the privacy of residents.

IV.B.9 Highway, Public Transportation, and Other Transportation Impacts

The proposed highway would benefit the regional highway system and the local transportation network, as described in Chapter I. The proposed highway would close no local roads. The project would maintain access to all remaining parcels. Western Illinois University operates a transit service (GOWEST) primarily to fulfill the university's needs, but the system also serves stops within the City of Macomb. The system would not be affected. The proposed highway would be on bridges passing over the Burlington Northern Santa Fe (BNSF) railroad tracks at two locations. It would not include any at-grade railroad crossings. There are no designated multi-use or bicycle trails within the City of Macomb, McDonough County, or the project corridor. The proposed highway would not affect the Macomb Municipal Airport or its plans for expansion. The proposed highway would require the purchase of some land from Smith Airfield. The project would move the entrance to the airfield from US 67 to US 136/US 67 east of the proposed interchange.

IV.B.10 Industrial Sites

The proposed highway would not use land from McDonough County and the City of Macomb's enterprise zone nor the industrial park on the east side of Macomb.

IV.B.11 Employment

The proposed highway would not increase the permanent labor force for the City of Macomb or McDonough County except to the extent that it acts as a catalyst to encourage new industrial development. The proposed highway would not impede access to jobs and current employment centers in the area. Out-of-town employees would benefit from the improved regional access offered by this project and other highway improvements in the region.

Construction of the proposed highway would result in the creation of temporary construction-related jobs. Table IV-1 reflects the potential temporary labor force increases that could result from the creation of construction jobs related to the proposed highway.

Table IV-1. Construction Related Employment

	Capital Cost of Proposed Highway	Multiplier (jobs per \$1 million in cost)	Jobs
Direct Employment ¹	\$146.1 million	Low Estimate: 7.10 High Estimate: 9.75	1,037 1,424
Indirect Employment ²	\$146.1 million	Low Estimate: 9.25 High Estimate: 12.70	1,351 1,855

¹On-site construction annual full-time employment

²Off-site manufacture and preparation of supplies and equipment

Source: "Analysis of Employment Statistics: Field Survey to Determine Employment Impacts of the Surface Transportation Act of 1982, Final Report", Robert Gorman, Federal Highway Administration, Washington, DC, 1985

Construction of the proposed highway would employ an estimated 2,388 to 3,279 people. In 2000, 7.2 percent of the total labor force in McDonough County was unemployed. Depending on the skill level of construction related jobs, and the amount of non-local employees a contractor uses on a construction project, there should be sufficient labor force in McDonough County to fill positions that may be created by the proposed highway.

IV.B.12 Tax Revenues

Using information from the McDonough County Clerk's Office received June 2003, a revenue impact analysis was performed for each taxing district directly affected by the proposed alignment. Analysts calculated the effect on property tax revenues, determining total hectares (acres) of right-of-way required from each taxing district, an assessed value per acre of the soil types to be affected, and the market value of displaced structures. Analysts multiplied the total area purchased for the right-of-way in each tax district by the value per unit of area and the 2002/2003 taxing rate for that district. Tax revenues lost to highway right-of-way were divided by the total estimated assessed value of all land in each tax district to obtain a percentage of tax revenue lost.

Table IV-2 indicates that purchase of right-of-way for the proposed alignment would result in a tax loss for each taxing district of less than one percent to 3.07 percent. The total annual

Table IV-2. Tax Revenue Impact Analysis

Taxing Body	Hectares (Acres) Converted to R.O.W./ Structures Displaced ¹	2002 Assessed Value Per Acre ²	2002/03 Assessed Value of Structures (Residence/ Business)	2002/03 Tax Rates per \$100 in Assessed Value	Annual Revenue Loss in 2002/03 Dollars	2002/03 Total Estimated Assessed Value for Taxing Body	Percent Tax Loss
Macomb Township District	119 (293) 2 Residences 1 Business	\$205	\$124,785/ \$95,300	1.08906	\$3,051	\$9,117,607	3.07%
Emmet Township District	147 (363) 4 Residences	\$205	\$172,845	0.91379	\$2,259	\$17,786,274	1.39%
Chalmers Township District	15 (37)	\$205	0	0.87371	\$66	\$10,973,981	0.07%
Scotland Township District	5 (13)	\$205	0	1.1462	\$31	\$11,039,679	0.02%
Macomb Airport Authority District	26 (65)	\$205	0	0.09209	\$12	\$118,627,414	0.01%
Unit School District 185	286 (706) 6 Residences 1 Business	\$205	\$297,630/ \$95,300	5.9005	\$31,725	\$172,372,595	0.31%
Spoon River College	286 (706) 6 Residences 1 Business	\$205	\$297,630/ \$95,300	0.4827	\$2,595	\$176,733,094	0.30%
Good Hope-Sciota Fire Protection District	21 (52) 2 Residences 1 Business	\$205	\$124,785/ \$95,300	0.20671	\$477	\$26,123,226	0.88%
Emmet-Chalmers Fire Protection District	168 (414) 4 Residences	\$205	\$172,845	0.12736	\$328	\$19,563,195	1.32%
County Tax District	286 (706) 6 Residences 1 Business	\$205	\$297,630/ \$95,300	1.18989	\$6,398	\$301,389,372	0.18%
City-County Building Commission	286 (706) 6 Residences 1 Business	\$205	\$297,630/ \$95,300	0.02953	\$159	\$301,389,372	0.18%
TOTAL					\$47,101		

¹ Land area, residences, and businesses counted for multiple taxing bodies because of over lapping taxing district boundary lines. Land purchased from the City of Macomb is not included since it was already in the public domain.

² Assessed value per acre is a weighted average of tax value per acre of the 28 soil types to be affected by project.

revenue loss for all taxing districts at 2002/2003 rates would be **\$47,101**. Displaced residential and commercial units could rebuild in the area. Therefore, tax losses could be short term. The construction of the proposed highway could create commercial and economic development that may increase revenues in local taxing districts and offset the short-term losses caused by the removal of property from the tax base.

IV.C AGRICULTURAL

This section describes impacts to farm units and farm operations. A farm unit is defined as one or more parcels of land farmed as a single operation. Although farmed under one management, a farm unit may be under multiple ownership. The US Department of Agriculture/Farm Service Agency (USDA/FSA) in McDonough County was used to identify the boundaries of individual farm units in the project corridor.

Agricultural impacts are summarized in Table IV-3 and Table IV-4. The proposed highway would affect 56 farm units, and **five** farm residences (plus one non-farm residence) and **11** outbuildings. The proposed highway would convert approximately **287.7** hectares (**710.9** acres) of land to other uses. This number includes all land to be purchased for right-of-way and land-locked parcels. Construction of the proposed highway itself would require **243.0** hectares (**600.5** acres) of farmland. In addition, **44.7** hectares (**110.4** acres) of land would be land-locked by the proposed highway and 59.7 hectares (147.6 acres) would be used for environmental mitigation. The proposed highway would create another 3.6 hectares (8.8 acres) of uneconomic remnants. Approximately **191.9** hectares (**474.2** acres) or **67** percent of the total farmland converted to other uses by the proposed highway is prime farmland. The estimated annual loss of agricultural income that would result from the proposed highway is **\$163,774**.

The proposed highway would use land from all four centennial farms in the project corridor. One farmstead associated with a centennial farm would be displaced. This farmstead is not listed on or eligible for inclusion in the National Register of Historic Places. It would bisect 24 farm units with 26 severances, laterally or diagonally, thereby dividing a parcel of land into two or more individual plots. Seven land-locked parcels would occur on six farms; four uneconomic remnants would occur on four farms; and 110 severance management zones would be created (35.1 hectares/86.7 acres). Seven farm units would experience adverse travel because of parcel severances. The proposed highway would maintain existing surface and subsurface drainage between the farm units and parcels it severs.

Table IV-3. Impacts to Farm Units and Operations

Impact Type	Hectares	Acres	Number
Farm Units	-	-	56
Centennial Farms	-	-	4
Displaced Agricultural Buildings	-	-	11
Displaced Agricultural Residences	-	-	5
Parcel Severances	-	-	26
Severance Management Zones	35.1	86.7	110

Table IV-4. Farmland Impact Types

Impact Type	Hectares	Acres	Number
Land Locked Parcels	44.7	110.4	7
Environmental Mitigation	59.7	147.6	1
Right-of-Way Taking	243.0	600.5	-
Subtotal	347.4	858.5	-
Uneconomic Remnants	3.6	8.8	4
Total	351.0	867.3	-

IV.C.1 Farmland Usage, Displacements, and Soils

Farmland

The proposed highway would convert approximately **287.7** hectares (**710.9** acres) of land to other uses. (See Table IV-5.) This number includes all land to be purchased for right-of-way and land-locked parcels. Construction of the proposed highway would require **243.0** hectares (**600.5** acres) of farmland. Of the total farmland converted to other uses, approximately **184.1** hectares (**454.9** acres) are cropland, and **15.8** hectares (**39** acres) are pastureland. The remaining **87.8** hectares (**217.0** acres) that would be converted to other uses would include hedgerows, wetlands, forested lands, abandoned fields, and areas immediately surrounding farm residences that are not productive farmland, but which are part of an individual farm unit. In addition, 3.6 hectares (8.8 acres) of uneconomic remnants of active farmland would be created from four of the 56 farm units (see Exhibit II-3f, j, and m). These remnant parcels would be two hectares (five acres) or less in size, and too small to be farmed economically. In addition, **44.7** hectares (**110.4** acres) of land on seven parcels would be land-locked by the proposed highway on six farms, and 59.7 hectares (147.6 acres) of land purchased from the City of Macomb would be used for environmental mitigation. In total, the farmland that would be purchased for the proposed highway represents approximately 0.19 percent of the 152,106 hectares (375,869 acres) of farms in McDonough County.

Table IV-5. Farmland and Buildings Affected

	Converted to Other Uses ¹
Farmland Type	
• Cropland loss in hectares (acres)	184.1 (454.9)
• Pasture loss in hectares (acres)	15.8 (39.0)
• Other farmland loss in hectares (acres)	87.8 (217.0)
Total farmland converted in hectares (acres)	287.7 (710.9)
Buildings	
Displaced farm residences (number of parcels)	5
Displaced outbuildings (number of parcels)	11

¹Includes area required for construction of the proposed highway and land-locked parcels.

In order to avoid additional impacts to agricultural resources, the seven land-locked parcels and the 59.7-hectare (147.6-acre) mitigation site would be utilized to mitigate loss of flood plain forest, upland forest, and prairies. Wetland impacts would be mitigated at a site previously agreed upon during the IL 336 (FAP 315) improvements (southeast of Carthage, Illinois to US 136 just west of Macomb) planning phase. In addition to using the land-locked parcels for environmental mitigation, the areas currently in cropland or non-native grasses would be investigated for use as borrow areas. This could reduce impacts to additional agricultural areas during construction.

Buildings

Based on a field reconnaissance and review of recent aerial photographs, analysts found that the proposed highway would displace **five** farm residences (plus one non-farm) and **11** outbuildings.

The "Uniform Relocation Assistance and Real Property Acquisition Act of 1970, as amended" applies to all federal or federally assisted activities that involve the acquisition of real property or the displacement of residences or businesses. The IDOT would provide just compensation for each property acquired by new right-of-way. Just compensation is a monetary payment equivalent to the "fair market" value of the property. Fair market value is the highest price estimated in terms of money that the property would bring, if exposed to sale on the open market, with a reasonable time allowed to find a buyer, buying with the knowledge of all of the uses to which it is adapted, and for which it is capable of being used. Mitigation of relocation impacts or displaced structures would be in the form of financial remuneration or compensation for property loss and relocation expenses, as outlined in the Uniform Relocation and Real Property Acquisition Act, as amended. (See Section IV.B.5.)

Agricultural Soils

As proposed, **67** percent, or **191.9** hectares (**474.2** acres), of the total farmland that would be converted by the project from agricultural use is classified as prime farmland (see Table IV-6). Another **16** percent, or **47.8** hectares (**118.1** acres), of farmland that would be converted is classified as important farmland.

Land Capability

Table IV-7 identifies the numbers of acres of each land capability class that would be used for the proposed highway. Soils within the project corridor vary from Class I to Class VII (with the exception of Class V). The majority of the soils that the proposed highway would affect fall under the first three classes. Normally, prime and statewide important soils are classified in one of the first three categories.

Table IV-6. Conversion of Prime and Important Farmlands¹

Category	Hectares Affected		Total in McDonough County
	Hectares (acres)	% of Total Affected	Hectares (acres)
Prime	191.9 (474.2)	67%	110,016 (271,711)
Important	47.8 (118.1)	16%	23,252 (57,427)
Other	48.0 (118.6)	17%	18,838 (46,525)
TOTAL	287.7 (710.9)	100.0%	152,106 (375,663)

¹Includes area required for construction of the proposed highway and land-locked parcels.

Table IV-7. Conversion of Soils by Land Capability Classification

	Soils Used ¹		McDonough County	
	Affected Area in hectares (acres)	% of Total Affected	Area in hectares (acres)	% Affected in County
Class I	74.7 (184.6)	26%	44,064 (108,827)	0.17%
Class II	110.1 (272.0)	38%	63,930 (157,891)	0.17%
Class III	55.4 (136.9)	20%	28,548 (70,506)	0.20%
Class IV	18.9 (46.7)	7%	2,845 (7,026)	0.70%
Class V	0.0 (0.0)	0%	724 (1,788)	0.00%
Class VI	1.2 (3.0)	0%	8,171 (20,180)	0.10%
Class VII	25.9 (64.0)	9%	3,824 (9,444)	0.67%
Class VIII	0.0 (0.0)	0%	0 (0)	0.00%
None	1.5 (3.7)	0%	522 (1,289)	0.26%
TOTAL	287.7 (710.9)	100%	152,628 (376,952)	0.19%

Note: None refers to an urban soil (Orthents) that is not included in one of the eight NRCS soil classifications.

¹Includes area required for construction of the proposed highway and land-locked parcels.

Soil Type and Erodible Soils

Table IV-8 is a listing of soils by type in the area used by the project.

Soils that would be converted to other uses by the proposed highway, including those associated with project construction and land-locked parcels were evaluated for erodibility. The soil properties and qualities for each soil type were derived from the November 1997 Soil Survey of McDonough County. Table IV-9 presents evaluation findings. Approximately 32 percent of the soils affected have a severe erosion hazard. These soils have slopes that range from five to 60 percent and are generally found in areas of rolling and steep terrain, such as the ravines along the tributaries to the East Fork of the La Moine River.

Another 27 percent of the soils have an erosion hazard of moderate. These soils are generally associated with drainage swales or gently rolling terrain, and have slopes that range from two to five percent. The remaining soils (41 percent) are open, flat, agricultural lands, with little to no erosion hazard or have been converted into a lake. The slope of these soils is less than two percent.

During the construction of the proposed highway, the IDOT would follow all standard specifications for erosion control. Specific erosion control practices would be developed during the design phase of the project. (See Section IV.I.1 and Table IV-20 for a discussion of construction-related erosion and sediment controls.)

Table IV-8. Soil Types Within Area Used by the Project

Soil Type	Hectares	Acres
Atlas silty clay loam (7D3)	0.4	0.9
Bowns silt loam (386B)	5.3	13.1
Clarksdale silt loam (257A)	2.2	5.4
Clarksdale silt loam (257B)	3.0	7.3
Elco silt loam (119C2)	1.0	2.5
Elco silt loam (119D2)	9.1	22.4
Fishhook silt loam (6D2)	1.3	3.2
Hickory silt loam (8D2)	2.9	7.3
Hickory silt loam (8F)	19.9	49.2
Hickory silt loam (8G)	19.8	48.9
Ipava silt loam (43A)	64.3	158.9
Ipava silt loam (43B)	7.5	18.5
Keomah silt loam (17A)	14.6	36.1
Keomah silt loam (17B)	6.1	15.1
Marseilles silt loam (549 F)	0.6	1.6
Orthents, loamy gently sloping (802B)	0.5	1.3
Rozetta silt loam (279B)	17.0	42.0
Rozetta silt loam (279C2)	31.5	77.8
Rozetta silt loam (279D2)	2.8	6.9
Sable silty clay loam (68)	27.2	67.2
Sawmill silty clay loam (3107)	1.4	3.4
Tama silt loam (36B)	34.1	84.4
Tama silt loam (36B2)	3.9	9.6
Tama silt loam (36C2)	2.0	5.0
Wakeland silt loam (3333)	8.3	20.5
Lake	1.0	2.4
TOTAL	287.7	710.9

Table IV-9. Erodible Soils Converted¹

Erodibility Class	Hectares	Acres	Percent
None	8.3	20.6	3%
None/Slight	110.1	272.1	38%
Moderate	77.1	190.4	27%
Severe	92.2	227.8	32%
TOTAL	287.7	710.9	100%

¹Includes area required for construction of the proposed highway, land-locked parcels, and area planned for environmental mitigation.

Conservation Reserve Program Lands

The Conservation Reserve Program (CRP) encourages farmers to voluntarily plant permanent areas of grass and trees on land that needs protection from erosion, to act as windbreaks, or in places where vegetation can improve water quality or provide food and habitat for wildlife. In return, they receive annual rental payments, incentive payments for certain activities and cost-share assistance to establish the protective vegetation. Table IV-10 lists those properties within the project area that have set aside land under the CRP and those affected by the proposed highway. CRP land would be acquired from two properties for a total of 3.8 hectares (9.4 acres).

Table IV-10. Conservation Reserve Program Impacts

Owner	Tract	CRP Lands Project Area in Hectares (acres)	Project Impacts to CRP Land in Hectares (acres)
Dorothy Allen	1738	0.12 (0.3)	0.0
Jon E. & Troy E. Ausbury	7911	0.36 (0.9)	0.0
M&R Farm	2872	8.90 (22.0)	2.99 (7.40)
Gregory McKee	1170	0.53 (1.3)	0.0
Brookhart Trust	1128	2.63 (6.5)	0.81 (2.00)
Barbara J. Markley	1380	15.30 (38.0)	0.0
TOTAL	6	27.80 (69.0)	3.8 (9.4)

Centennial Farms

The proposed highway would use land from all the four centennial farms in the project corridor. The proposed US 67 interchange north of Macomb would displace the farmstead associated with one of the centennial farms. (See Section IV.B.5.) This farmstead is not listed on or eligible for inclusion in the National Register of Historic Places. It would create 8.2 kilometers (5.1 miles) and 1.2 kilometers (0.75 mile) of adverse travel for two of the four centennial farms. In addition, the proposed highway would sever three centennial farms, and would create severance management zones on all four farms.

IV.C.2 Protected Agricultural Areas

There are no protected agricultural areas in the project corridor.

IV.C.3 Agricultural Income Loss

The proposed alignment would result in a loss of agricultural income of **\$163,774** annually (**199.9** hectares of crop or pastureland converted times \$819.28 per hectare or **493.9** acres at **\$331.59** per acre).

Average agricultural income per hectare (acre) values were derived by dividing the total number of farm hectares in McDonough County into the total value of products sold (see Table II-5). The

resulting figure gives an approximate annual income estimate for a hectare (acre) of land. The estimated **\$163,774** annual loss is less than 0.2 percent of the total value of products sold in McDonough County.

IV.C.4 Severances, Remnants, and Land-locked Parcels

Table IV-11 lists the number of severed farm parcels, uneconomic remnants, and land-locked parcels the proposed alignment would create. Exhibit IV-1 illustrates the characteristics of these types of agricultural impacts.

Table IV-11. Farm Severances, Uneconomic Remnants, and Land-locked Parcels

	Affected Farm Units	Number	Hectares	Acres
Diagonal or Lateral Severances	24	26	--	--
Severance Management Zones	33	110	35.1	86.7
Uneconomic Remnants	4	4	3.6	8.8
Land-locked Parcels	6	7	44.7	110.4
Centennial Farms Affected	4	4	--	--

Farm Severances

The proposed highway would bisect 24 farm units, either laterally or diagonally, thereby dividing a parcel of land into two or more individual plots. It would sever two of these 24 farm units twice. Some of the severed farm units would be too small to continue to be utilized as agricultural fields, and have been classified as uneconomic remnants.

Severance Management Zones

Quantified in acres, severance management zones are those areas created within or adjacent to severed parcels that are measured to determine quantitatively the disruption to normal farming operations. The triangular shape resulting from diagonal severance is the basis for many problems such as point rows, or angular field ends, harvest losses because of excessive turning and overlapping applications of herbicides. These all lead to waste, expense and increased energy consumption. (See Exhibit IV-1.)

The proposed highway would create severance management zones on 33 farm units, 35.09 hectares (86.7 acres) in area.

Uneconomic Remnants

Uneconomic remnants are defined as any parcel of real property in which an owner is left after partial acquisition of the owner's property, and which the IDOT determines has little value or utility to the owner. The IDOT would offer to acquire any and all uneconomic remnants if the owner wishes to sell them. For the purpose of this study, a remnant was generally considered to be uneconomical if it were to be two hectares (five acres) or less in size. The proposed highway

would create four uneconomic remnants (see Table IV-12 and Exhibit II-3f, j, and m), and take 3.6 hectares (8.8 acres) out of agricultural production. Uneconomic remnants would be given consideration as potential borrow sites for the project (see Section IV.Q.1).

Table IV-12. Uneconomic Remnants

Uneconomic Remnant #	Near Design Station Number	Owner	Hectares	Acres
1	136+432	Charles H. Flack	0.05	0.12
2	202+445 - 202+715	S.H. Shaver	0.62	1.53
3	106+880 - 107+030	Scott E. Miller	2.17	5.36
4	100+850 – 101+100	Robert & Terri Nelson	0.71	1.76
TOTAL			3.55	8.77

Land-locked Parcels

A land-locked parcel is a portion of land isolated by a highway project, rendering it inaccessible by a public road, existing or proposed easements, or new or relocated driveways. The proposed highway would create seven land-locked parcels, totaling **44.7** hectares (**110.4** acres). Of these, **13.2** hectares (**32.6** acres) are cropland and 8.0 hectares (19.8 acres) are pasture. The remaining **23.5** hectares (**58.0** acres) are hedgerows, wetlands, forested lands, abandoned fields, and floodplain.

All seven land locked parcels would be purchased, as shown in Table IV-13. As appropriate, land locked parcels are proposed for use in mitigating project impacts (see Section IV.H.3). These land-locked parcels also were factored into the estimated agricultural income loss described in Section IV.C.3. In all cases, the introduction of a frontage road was considered to provide access to the property. In each case, the frontage roads were not added because the cost of the frontage road (additional right-of-way and construction) exceeded the cost of purchasing the land-locked parcel.

Access to the remaining 49 farm units would be maintained if the proposed highway is constructed. Nine new access roads (a total of 6.2 kilometers or 3.9 miles) would be built to maintain access to 17 farm units affected by the proposed highway. (See Exhibit II-2a through Exhibit II-2q.) The effects of access road construction on existing farmland and farm operations have been included in data presented in all sections addressing farmland impacts.

IV.C.5 Adverse Travel by Farmers

Adverse travel is the additional miles traveled by a farmer to reach a parcel severed or otherwise affected by the proposed highway.

Table IV-13. Landlocked Parcels

Land Locked Parcel #	Near Design Station Number	Owner	Hectares	Acres
1	201+500	C. Cross	1.5	3.6
2	205+360 - 205+755	Max Runkle	1.9	4.6
3	208+180 - 708+927	Gregory McKee	2.2	5.5
4	106+070 - 106+780	Brookhart Trust	9.9	24.5
5	105+562 - 106+070	Brookhart Trust	2.5	6.1
6	103+960 - 104+835	Robert Bland & Mary Vogler	22.8	56.4
7	102+745 - 103+005	John N. Corson	3.9	9.7
TOTAL			44.7	110.4

Analysts determined adverse travel impacts by identifying the shortest route necessary to travel from the edge of the field of one severed parcel via a public road, existing easement or access road, to the field of a second severed parcel under the same ownership. Analysts then doubled the distance to account for one round trip. They also calculated existing round trip miles traveled currently to reach the same field. The difference between the two distance estimates is the adverse miles traveled.

Seven of the 56 farm units would experience adverse travel with the proposed highway (see Table IV-14). The total distance of adverse travel would be 26.5 kilometers (16.6 miles).

Table IV-14. Adverse Travel

Farm Operator	Design Station Number	Adverse Travel in Kilometers (Miles)
Bryan	205+800	8.2 (5.1)
McDonald	207+800	1.2 (0.8)
Agronomics	107+300 and 105+500	7.2 (4.5)
Prunty	209+500	6.9 (4.3)
Wicklund	202+000	0.5 (0.3)
Brooks	105+000	0.6 (0.4)
Ausbury	136+300	1.9 (1.2)

IV.C.6 Surface and Subsurface Drainage Maintenance

The proposed alignment would maintain existing surface and subsurface drainage between the farm units and parcels it severs. Project design would include the design of means for maintaining surface and subsurface drainage.

IV.C.7 Mitigation Measures

Agriculture is the predominant land use in McDonough County. It is not possible to place a rural highway corridor in this county that would not, to some extent, adversely affect farming operations on prime and important farmlands. The following management and design practices were and would continue to be incorporated into the proposed alignment to help minimize disruptions to agricultural activities and help limit adverse impacts to designated soils:

- Design alignment to parallel property lines, where feasible, to keep farm severances, severance management zones and uneconomic remnants to a minimum.
- Construct field access roads **where practical** to maintain access to farm fields.
- Maintain existing surface and subsurface drainage.
- Meet with the IDOA and local agricultural agencies to obtain firsthand knowledge and awareness of impacts.
- Implement sedimentation and erosion control measures to minimize loss of topsoil into streams and roadside ditches.
- Locate field tiles draining to, or intersected by, the proposed highway's right-of-way by trenching in order to ensure that proper field drainage is maintained during construction.
- **Investigate land-locked parcels for use as borrow areas.**

IV.C.8 Farmland Conversion Impact Rating

The IDOT and the USDA use the Land Evaluation and Site Assessment (LESA) System to assess the viability of agricultural land for continued agricultural production when such land may be affected by state and federal projects. The results of the LESA evaluation are provided on the USDA's "Farmland Conversion Impact Rating," Form AD-1006. The NRCS evaluates the quality (productivity of the soils that will be affected), while the IDOA rates site-specific factors, including:

- The amount of agricultural land required;
- The proximity of the land to be acquired to existing highway right-of-way;
- Off-site land required for borrow materials and wetland mitigation;

- Creation of (a) severed parcels, (b) uneconomical remnants, (c) landlocked parcels and (d) adverse travel;
- Relocations of rural residents and farm buildings; and
- Whether highway design standards would be used that minimize impacts to agricultural land.

The Federal FPPA requires that sites or alternatives with the highest combined LESA scores (determined on Form AD-1006) should be regarded as most suitable for protection from conversion to non-farm use, and sites/alternatives with the lowest scores as least suitable for such protection. Sites or alternatives receiving total scores of 175 or fewer points require only minimal consideration for protection from conversion, and no additional sites/alternatives need be evaluated. Sites or alternatives with scores 176 to 225 points are in the moderate range for consideration of protection from conversion. At least one alternative should be considered for such projects. Sites or alternatives receiving scores over 225 points should receive the highest priority for protection from conversion to non-farm uses. For such sites or alternatives, consideration should be given to other alternatives such as rehabilitation of existing facilities and alignments that use lesser amounts of farmland. Therefore, alternatives that adversely affect agriculture may be recommended, but only after full consideration of adverse effects and less damaging alternatives. The LESA evaluation for the preferred alternative resulted in a score of 272 points for the proposed alignment.

Selection of a preferred alternative was based on alternative studies conducted from 1994 to 2003. Full consideration was given to adverse effects on agricultural land and less damaging alternatives. These studies and their findings are described in Chapter III. The use of other modes of travel, improving existing roads, and an expressway design were considered but would not meet the purpose and need for the project. The deficiencies of these alternatives are described in Sections III.B.1 and III.B.2. Thirty alignments for a bypass were developed and screened during the course of the alternatives studies (see Section III.B.3). Because of the large amount of agricultural land in the project area, it was not possible to avoid or substantially avoid impacts to agricultural land. However, throughout the process, alignment alternatives with greater agricultural impacts were dropped as candidates for the preferred alternative whenever possible. For example, all of the alternatives in the South Corridor were withdrawn from further study in part because of their greater agricultural impacts than the comparable Northwest Corridor alternatives. In addition, the Northwest Corridor and Northeast Corridor alternatives were revised to reduce agricultural impacts whenever possible (e.g., shifting the alignment to reduce the amount of agricultural land required and moving the alignment to the edge of farmed fields rather than bisecting the fields). See Appendix C for the AD-1006 form.

IV.D CULTURAL

IV.D.1 Historic Resources

Three homes within the project area were identified as potentially eligible for inclusion in the National Register of Historic Places (NRHP). However, these three properties would not be directly affected by the proposed highway, and no land will be taken from any of these properties. The proposed project would have no effect, direct or indirect, on historic resources listed on or eligible for inclusion in the NRHP. **The Illinois Historic Preservation Agency concurred that**

no structures of historic or architectural significance are in the proposed project's right-of-way in response to the IDOT's letter of February 10, 2003 (see Appendix A).

IV.D.2 Archaeological Sites

Of the 60 archaeological sites found, 21 will require subsurface evaluation should they be affected by the final highway alignment. All of the sites that merit further evaluation have potential National Register significance because of the data that they may yield concerning prehistoric life-ways in this region of Illinois. No archaeological sites historically associated with federally-recognized Native American tribes were found within the project corridor. No archaeological sites that merit preservation in place would be affected by the proposed highway alignment. The results of subsurface investigations of archaeological sites, and any others found subsequently, would be evaluated for a determination of eligibility (DOE) for the National Register of Historic Places. A formal DOE would be submitted to the Illinois SHPO for concurrence. Should any of these properties be determined eligible, the FHWA and the Illinois State Historic Preservation Office (SHPO) would follow the stipulations of the "Programmatic Agreement for the Mitigation of Adverse Effects to Illinois Archaeological Habitation Sites" in order to mitigate any adverse effects on these archaeological properties. **The Illinois Historic Preservation Agency concurred with the IDOT's findings related to archaeological resources in the project area in response to the IDOT's letter of February 10, 2003 (see Appendix A).**

IV.E AIR QUALITY

A Pre-Screen analysis was completed for the proposed project. The results from this analysis indicated that a full screening analysis using the Illinois Carbon Monoxide Screen for Intersection Modeling (COSIM) was not required, as the results for the worst-case receptor were below the eight-hour average National Ambient Air Quality Standard (NAAQS) for CO of 9.0 parts per million (ppm) which is necessary to protect the public health and welfare.

No portion of this project is within a designated nonattainment area for any of the air pollutants for which the USEPA has established standards. Accordingly, a conformity determination under 40 CFR Part 93 ("Criteria and Procedures for Determining Conformity to State or Federal Implementation Plans of Transportation Plans, Programs, and Projects Funded or Approved Under Title 23 USC of the Federal Transit Act") is not required.

IV.F NOISE

Traffic traveling on the proposed alignment would affect noise levels at nearby homes. This section describes existing noise levels at these homes and the change in noise levels that forecast bypass traffic for 2020 would create. The analysis contrasted predicted existing condition and design year (2020) noise levels with the Federal Highway Administration's Noise Abatement Criteria (NAC) to determine whether noise abatement measures should be considered. Analysts then conducted a noise abatement analysis at affected homes to determine the effectiveness and reasonableness of sound walls and other abatement measures. The noise analysis was conducted in accordance with the methodology established in Title 23 CFR, Part 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise*, and guidelines provided in Chapter 26, of IDOT's Bureau of Design and Environment Manual (December 2002).

Future traffic noise from the proposed Macomb Bypass would affect **16** of the **62** sites (**61** homes and one potential future home site) evaluated. Noise levels at five homes are predicted to approach or exceed the NAC for Activity Category B (67 dBA). An additional **ten** homes are

predicted to experience a substantial increase (greater than 14 dBA above existing levels) in future noise levels. The noise level at one additional residence would both exceed the NAC and experience a substantial increase in noise (greater than 14 dBA) above existing levels. Abatement studies found that available options for reducing noise levels at these homes are neither reasonable nor feasible because of the distance of the affected residences from the proposed alignment **or barriers are not economically reasonable**.

IV.F.1 Fundamental Concepts of Highway Noise

Sound levels are expressed in units called decibels (dB). Since the human ear does not respond equally to all frequencies (or pitches), measured and predicted sound levels are often adjusted or weighted. This adjusted sound level corresponds to the frequency response of human hearing and the human perception of loudness. The adjusted sound level is expressed in units called A-weighted decibels (dBA).

The general principle on which most noise acceptability criteria are based is that a change in noise is likely to cause annoyance wherever it intrudes upon the existing noise from all other sources. Annoyance depends upon the noise that exists before the start of a new noise-generating project or an expansion of an existing project. Generally changes in noise levels less than 3 dBA will be barely perceived by most listeners, whereas a 10 dBA change normally is perceived as a doubling (or halving) of noise levels.

The sound level from any roadway fluctuates from moment to moment as time passes. To take this into account, a common descriptor for environmental noise is Leq. Leq is defined as the continuous A-weighted sound level that in a given time period contains the same energy as the actual time-varying sound during that period. Leq for traffic noise is evaluated over the one-hour period of peak traffic. All noise levels determined in this study are one-hour Leq or Leq(h).

IV.F.2 Ambient Measurements

Field measurements were conducted according to procedures described in *Measurement of Highway-Related Noise* (Report No. FHWA-PD-96-046, May 1996). Concurrent with noise measurements, surveyors counted vehicles by classification and noted unusual noise events (sirens, pedestrian noises, barking dogs, aircraft, trains, etc.). Surveyors measured noise levels with a calibrated Bruel & Kjaer Sound Level Meter 2231 fitted with a B&K Type 5155 condenser microphone and windscreen. They mounted the microphone at an approximate height of 1.65 meters (5.4 feet) above ground level, which is equal to the average height of the human ear. They performed the measurements under acceptable climatic and street surface conditions.

Surveyors measured ambient noise levels at the northwest corner of Tower Road (1400N) and 950E. (See Table IV-15.) This location represents a typical residence in this area. Exhibit II-3e illustrates the monitoring location. Surveyors took measurements on two consecutive days during estimated AM and PM peak traffic periods to characterize the daily noise exposure at the site and area around it. Table IV-15 presents the results of the field measurements. The highest measured noise level [Leq(h)] was 55.6 dBA and the lowest was 47.0 dBA.

IV.F.3 Noise Abatement Criteria

The FHWA's Noise Abatement Criteria (NAC) is described in Title 23 of the *Code of Federal Regulations*, Part 772. Table IV-16 presents these criteria. The NAC varies by activity category. The NAC are noise impact thresholds for determining when consideration of noise abatement measures could be warranted. The NAC are not design criteria or targets.

Table IV-15. Ambient Noise Measurement Results

Location	Land Use	Date	Peak Period	Existing Conditions ¹
Northwest corner of Tower Road/1400N and 950E	Residential (Category B)	8/31/99	AM	54.1
			PM	53.8
		9/1/99	AM	55.6
			PM	47.0

¹ Measured Leq (dBA)

Table IV-16. FHWA's Noise Abatement Criteria

Activity Category	Leq(h) (dBA)	Description of Activity
A	57 Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 Exterior	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 Exterior	Developed lands, properties, or activities not included in Categories A or B.
D	--	Undeveloped lands.
E	52 Interior	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Source: Federal Highway Administration 23 CFR Part 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise*, Federal Highway Administration, USDOT, April 1992.

FHWA regulations indicate that noise abatement should be considered when future predicted traffic noise levels "approach" or exceed the NAC or when predicted traffic noise levels "substantially" exceed the existing condition noise levels. The term "approach" is defined to mean within 1 dBA of the NAC. For Activity Category B, which applies to all of the noise sensitive sites evaluated for this study, this translates to 66 dBA. A substantial increase in traffic noise levels is defined to be greater than 14 dBA above the existing noise levels.

IV.F.4 Noise Prediction Methodology

Existing and future traffic noise levels were predicted using the FHWA's Traffic Noise Model 2.0, computerized traffic noise prediction model. Analysts calculated existing noise levels and 2020 noise levels with and without the proposed alignment. They calculated noise levels at **23** sites

(representing **61** existing residences and one potential residence site in the Deer Ridge subdivision) in eight noise sensitive areas along the proposed alignment. Exhibit II-3 (all sheets) also shows the location of the **23** sites. The eight noise sensitive areas are:

1. The interchange between the proposed alignment and US 136, west of Macomb (receptor sites 1 and 2).
2. The area surrounding 900E between the intersections with Adams Street and Grandview Drive, including the Deer Ridge subdivision (receptor sites 3 through 8 and 22).
3. The area surrounding the intersection of 900E and 1350N (receptor sites 9, 10, **and 23**).
4. The interchange between the proposed alignment and US 67, north of Macomb (receptor sites 11 through 13).
5. The area where Springlake Road parallels the proposed alignment, just east of the US 67 interchange (receptor site 14).
6. Bower Road (1400E) where it intersects the proposed alignment (receptor sites 15 through 17).
7. East of Macomb where 1400N crosses the proposed alignment (receptor site 18).
8. The interchange between the proposed alignment and US 136/US 67, east of Macomb (receptor sites 19 through 21).

Computer model input parameters included the area's topography, receptor, and highway locations, and traffic data (i.e., traffic volumes, vehicle classifications, and speeds).

IV.F.5 Existing Noise Levels

Using model and year 2000 traffic data, existing condition noise levels were predicted at residences near the proposed project. The predicted noise levels for the existing condition range from 33 dBA to 73 dBA. Noise levels at four residences currently approach or exceed the NAC for Activity Category B. All of these locations are in the area where the proposed alignment would cross existing US 67 and US 136 to the east of Macomb. These roads currently carry the greatest traffic volumes in the project area and thus have the highest noise levels. The predicted existing condition noise levels are presented in Table IV-17.

IV.F.6 Design Year (2020) Noise Levels

In 2020 with the No-Action Alternative, noise levels at 11 residences are predicted to approach or exceed the NAC for Activity Category B of 67 dBA. The predicted levels at these 11 residences range from 66 dBA to 74 dBA. Similar to the existing conditions, the affected residences are in three areas where the proposed highway would cross US 67 or US 136. The projected increases in traffic volumes along US 67 or US 136 account for the increases in noise levels shown for the No-Action Alternative in Table IV-17.

Traffic noise levels with the proposed highway are predicted to approach or exceed the NAC at six residences. They include five of the same 11 residences that are affected in the No-Action Alternative. The change in noise levels from the proposed highway to the No-Action Alternative at these locations would be 1 dBA or less and, therefore, would not be perceptible.

Table IV-17. Predicted Noise Levels (dBA)

Noise Sensitive Area Number	Receptor Sites	Number of Residences	Existing Conditions Leq(h)	2020					
				No-Action Alternative			With Proposed Alignment		
				Leq(h)	Exceeds Abatement Criteria	Type ¹	Leq(h)	Exceeds Abatement Criteria	Type ¹
1	1	3	57	58	NO	N/A	62	NO	N/A
	2	3	65	66	YES	Sound Level	63	NO	N/A
2	3	1	45	47	NO	N/A	60	YES	Substantial Increase
	4	3	44	45	NO	N/A	50	NO	N/A
	5	11	41	42	NO	N/A	49	NO	N/A
	6	1	45	46	NO	N/A	52	NO	N/A
	7	12	39	40	NO	N/A	51	NO	N/A
	8	2	44	45	NO	N/A	52	NO	N/A
	22	1	38	39	NO	N/A	64	YES	Substantial Increase
3	9	3	35	37	NO	N/A	56	YES	Substantial Increase
	10	1	33	34	NO	N/A	57	YES	Substantial Increase
	23	1	35	36	NO	N/A	62	YES	Substantial Increase
4	11	1	49	52	NO	N/A	54	NO	N/A
	12	4	60	62	NO	N/A	61	NO	N/A
	13	4	65	67	YES	Sound Level	68	YES	Sound Level
5	14	2	38	41	NO	N/A	54	YES	Substantial Increase
6	15	1	46	47	NO	N/A	60	NO	N/A
	16	1	38	40	NO	N/A	61	YES	Substantial Increase
	17	2	49	50	NO	N/A	61	NO	N/A
7	18	1	35	36	NO	N/A	67	YES	Both
8	19	1	66	68	YES	Sound Level	63	NO	N/A
	20	2	73	74	YES	Sound Level	61	NO	N/A
	21	1	66	67	YES	Sound Level	67	YES	Sound Level
Affected Residences			4	11			16		

¹Type: Sound Level – Predicted noise levels at the receptor is 66 dBA or greater. Substantial Increase – Predicted noise levels at the receptor demonstrate a substantial increase over existing noise levels of greater than 14 dBA.

N/A – The type of impact is not applicable since there is no noise impact at that specific receptor.

The sixth residence (receptor 18 in noise sensitive area 7) is a single-family farmhouse that is 1,200 feet south of 1400N where it crosses the proposed highway northeast of Macomb. This residence is also predicted to experience a substantial increase in noise levels. Substantial increases (greater than 14 dBA above existing levels) are also predicted to occur at **ten** other residences (for a total of **11** substantial noise increases). These residences are in areas where little or no background traffic noise currently exists.

Noise levels at the three residences along the US 136/US 67 interchange, east of Macomb (receptors 19 and 20) are predicted to approach or exceed the NAC with the No-Action Alternative, but would fall below the NAC with the construction of the proposed highway. The relocation of US 136 at the interchange of the proposed highway and US 136/US 67 accounts for the reduction in noise levels at these residences. The noise level at receptor 12 is less with the proposed highway because through traffic volumes are expected to transition from US 67, the predominant source at receptor 12 for the No-Action Alternative, to the proposed highway.

IV.F.7 Evaluation of Abatement Measures

The feasibility and reasonableness of noise abatement measures were evaluated at the **16** residences where the predicted 2020 noise levels approach or exceed the NAC and/or result in a substantial increase in noise levels because of the proposed highway. Abatement measures were evaluated for only those residences which are predicted to experience future noise levels that approach or exceed the NAC and/or result in a substantial increase in noise levels because of the proposed highway.

As outlined in FHWA's guidelines, these measures may include: noise barriers, transportation system management measures, alignment modifications, property acquisitions, and land use controls. The design goal of an abatement measure is a reduction of 8 dBA or more. If a minimum reduction of 5 dBA cannot be achieved, an abatement measure is not considered feasible. Abatement studies found that available options for reducing noise levels at the **16** residences are neither reasonable nor feasible because of the distance of the affected residences from the proposed highway **or barriers are not economically reasonable**. Based on the noise study conducted for the proposed highway, there appears to be no apparent solution available to mitigate the traffic noise at these locations except at receptor site 22.

Noise Barriers

Noise barriers, including earth berms, reduce noise levels by blocking the sound path between a roadway and noise sensitive sites. To be effective in reducing traffic noise impacts, a noise barrier must have certain characteristics. The barrier must be long (theoretically the length of the barrier should be approximately four times the distance from the receptor to the source). It must be continuous (with no intermittent openings) and high enough to provide the necessary reduction in noise levels.

In order for a barrier to be considered feasible and economically reasonable, it must meet the following minimum criteria:

- Provide a minimum insertion loss (noise reduction) of 5 dBA with a desirable design goal of 8 dBA.
- The cost to construct the barrier should not exceed \$24,000 per benefited residence unless a higher level of expenditure can be justified by special circumstances. For purposes of this determination, benefited residences are those that would experience a reduction of 5 dBA or more in the level of traffic noise as a result of the noise barrier.

The barrier analysis found that barriers would not be a reasonable expense in any of the areas evaluated. The evaluation of each barrier was conducted using the noise prediction model. The barrier analysis found:

- Adams Street, West of the Proposed Highway (receptor 3). Analysts evaluated the placement of a noise barrier to abate for the home on the south side of Adams Street, 170 meters (558 feet) west of the proposed highway. The placement of a noise barrier along the proposed highway would not provide the minimum required insertion loss of 5 dBA because it is far from the highway. Furthermore, noise barriers are generally not economically reasonable to build at isolated residences.
- Intersection of 900E and 1350N Area (receptor sites 9, 10, and 23). Analysts modeled a noise barrier 535 meters (1,755 feet) long for a range of wall heights between 3.66 meters (12 feet) and 6.10 meters (20 feet). However, the analysis found that a barrier would fail to produce the minimum required insertion loss. The highest insertion loss calculated was 3 dBA for a wall height of 6.1 meters (20 feet).

A noise barrier analysis was not conducted for receptor site 23 for two reasons. Because of the isolated nature of this receptor, it would not be feasible to provide a noise barrier that would meet the IDOT's minimum cost criterion of \$24,000 per benefited residence. Also, this residence is immediately adjacent to CH 14/1350N, and it would not be feasible to provide a sufficiently long, continuous noise barrier (i.e., with no intermittent openings) to provide adequate noise reduction.

- Interchange between the Proposed Highway and US 67, North of Macomb (receptor site 13). Analysts modeled a noise barrier 180 meters (591 feet) long on the westbound off-ramp adjacent to the four homes lining US 67 north of the interchange. The barrier heights modeled varied from 3.66 meters (12 feet) to 6.10 meters (20 feet). However, the greatest insertion loss for the modeled receptors was only 3 dBA. Analysts also modeled a 211-meter (692-foot) noise barrier along the westbound bypass near the US 67 interchange. The same range of barrier heights was modeled, but once again the same insertion loss results were obtained.

A third scenario was also evaluated. Analysts modeled a noise barrier 300 meters (984 feet) long along US 67 beginning at its intersection with the westbound bypass off-ramp adjacent to the four homes lining US 67 north of the interchange. The barrier heights modeled again varied from 3.66 meters (12 feet) to 6.10 meters (20 feet). The desired insertion loss could be achieved, with an average insertion loss at the residences represented by receptor site 13 of 8 dBA. The cost to construct such a barrier, however, would be greater than \$200,000 per benefited residence, which far exceeds the cost criterion of \$24,000 per benefited residence. Thus, the barrier would not be economically reasonable.

In addition, US 67, and not the proposed bypass, would continue to be the predominant noise source at these four residences. The predicted noise level at these residences for the 2020 No-Action Alternative is 67 dBA, whereas the predicted noise level for the 2020 proposed highway is 68 dBA, which is an increase of only 1 dBA.

- Springlake Road (receptor site 14). The residences in this area are substantially closer to Springlake Road than the proposed highway, so the predominant noise source is Springlake Road, whose traffic is expected to increase. Thus, the bypass would only partially contribute to the increase in noise levels shown at this location in Table IV-17. Analysts modeled a noise barrier 183 meters (600 feet) long and 4.27 meters (14 feet) tall between the bypass and these homes. This barrier would achieve the minimum

required insertion loss, with an average insertion loss at the residences of 7 dBA. However, at a construction cost of \$25 per square foot, the total cost would be \$210,000, which would be a cost per benefited residence of \$105,000. The maximum cost per benefited residence should not exceed \$24,000. Therefore, the barrier would not be economically reasonable.

- Bower Road (1400E) and 1400N (receptor sites 16 and 18). At each of these two receptor sites, the proposed highway would affect only one residence. Noise barriers are generally not economically reasonable to build at isolated residences.
- Interchange between the Proposed Highway and US 136/US 67, East of Macomb (receptor site 21). The proposed highway would also affect only one residence at this receptor site. Once again, noise barriers are generally not economically reasonable to build at isolated residences.
- Deer Ridge Subdivision (receptor site 22). The results of the barrier analysis for this potential home site indicated that a 5 meter-tall (16.4 feet) by 100 meter long (328.1 feet) noise barrier would provide the desirable design insertion loss of 8 dBA at the site assessed. **A berm is included in the project design in this area. It is approximately 2.5 meters (8.2 feet) higher than the pavement surface. To provide the needed insertion loss, an additional barrier that provides an additional 2.5 meters (8.2 feet) in barrier height would be required on top of the berm.**

Transportation System Management Measures

Transportation system management measures that limit motor vehicle speeds and reduce traffic volumes can be effective noise mitigation measures. These measures, however, would negate the proposed highway's ability to meet the project's purpose and need.

Alignment Modifications

Alignment modifications generally involve orientating and/or siting the roadway at sufficient distances from noise sensitive areas to minimize noise impacts. As discussed in Chapter III, the study team evaluated numerous location alternatives for the Macomb Bypass. The location of the proposed alignment offers the most reasonable trade-off between various community, agricultural resource, and natural resource impacts.

Property Acquisition

Because of high cost, a property acquisition program to create noise buffer zones is not recommended.

Land Use Controls

Another noise abatement measure is the use of land use controls to minimize impacts to future development. Local government and planning agencies with land use control authority should consider anticipated noise level changes along the proposed alignment so new homes and other sensitive uses are set back from the bypass sufficiently to avoid noise impact.

IV.F.8 Construction Noise Impacts

During construction of the proposed alignment, the potential exists for short-term noise impacts generated by construction equipment. To reduce the potential for such impacts, the IDOT would require contractors to adhere to the latest edition of the *Standard Specifications for Road and*

Bridge Construction. These specifications include guidelines for screening stationary equipment, exhaust noise, noise from loose equipment parts, and excessive tailgate banging.

IV.G ENERGY

Construction of the proposed highway would require indirect consumption of energy for processing materials, construction activities, and maintenance for 20.5 kilometers (12.7 miles) of new four-lane limited access highway and its associated frontage roads, bridges, interchange ramps, and local access roads. Energy consumption in the area could increase during construction because of possible traffic delays.

Construction of the proposed highway would reduce congestion in downtown Macomb and reduce the travel distance of many through travelers. Additional benefits would result from increased capacity and smoother riding surfaces. This would result in less direct and indirect vehicle operational energy consumption for the proposed highway than the No-Action Alternative. Thus, in the long term, post construction operational energy requirements should offset construction and maintenance energy requirements and result in a net saving in energy usage.

IV.H NATURAL RESOURCE IMPACTS

This section discusses the impacts of the proposed alignment related to the loss of various plant communities and the loss of wildlife habitat, as well as the period required to replace these losses. A discussion of the potential for indirect ecological changes and the potential for affecting several areas of particular interest (defined in Chapter II) follows. The section concludes with a discussion of means for minimizing and mitigating vegetation and habitat loss and the potential for the proposed alignment to adversely affect threatened or endangered species.

The proposed highway would change the characteristics of existing vegetation and other land cover of **262.0** hectares (**647.3** acres). The greatest plant community impacts would involve the use of agricultural land (approximately **184.4** hectares would be changed or **455.5** acres) and upland forest (approximately **30.8** hectares or **76.1** acres) for road right-of-way. Effects to vegetation outside the project's right-of-way and mitigation areas could include weed invasion, reduced plant vigor, accelerated erosion, and shifts in species composition and/or diversity. The proposed highway would not affect any Illinois Natural Area Inventory (INAI) sites, nature preserves, or Land and Water Reserves. The proposed highway would include mitigation for wildlife habitat loss through both minimization of habitat loss, as well as habitat creation. Mitigation would focus on prairie and woodland impacts.

IV.H.1 Upland Plant Community Impacts

Direct impacts to upland plant communities were calculated based on the designed right-of-way for the proposed alignment and conversions for mitigation purposes on the mitigation site and the landlocked parcels. Right-of-way impacts to upland plant communities would total **234.3** hectares (**578.9** acres). Cover type impacts on the mitigation site purchased from the City of Macomb total 3.8 hectares (9.3 acres), excluding protected areas of upland forest, floodplain forest, and wetland. Cover type impacts for mitigation within the landlocked parcels total **23.9** hectares (**59.0** acres), excluding protected areas of upland forest, floodplain forest, and wetland. (See all sheets in Exhibit II-2 and Exhibit II-3). The analysis assumed that the project would affect all vegetation within the project's right-of-way. The primary direct effects on vegetation would be short-term and long-term losses from clearing, excavating, filling, placement of foundations and footings, and regrading. Effects to vegetation outside the project's right-of-way

could include weed invasion, reduction in plant vigor, accelerated erosion, and shifts in species composition and/or diversity.

Table IV-18 summarizes the area of each upland plant community affected. The greatest impact to vegetative cover types would occur in cropland (approximately **184.4** hectares or **455.5** acres) and upland forest (approximately **30.8** hectares or **76.1** acres). Impacts to the latter community would be primarily from crossing ravine slopes associated with the East Fork of the La Moine River and Spring Creek. The character of forested areas would experience the greatest change because of different patterns of light penetration, temperature, precipitation, and humidity. In addition, project impacts would include the loss of 6.8 hectares (16.9 acres) of mesic floodplain forest, and 0.9 hectares (2.2 acres) of prairie.

Table IV-18. Impacts to Upland Vegetation Cover Types

Plant Community	Direct Loss in hectares (acres)	Loss as a Percent of Plant Community Type as Contained Within 600-meter Corridor¹
Upland Forest	30.8 (76.1)	15%
Mesic Floodplain Forest	6.8 (16.9)	8%
Cropland (agricultural land)	184.4 (455.5)	18%
Hayfields	5.1 (12.5)	39%
Pasture	13.4 (33.0)	19%
Forbland	0.2 (0.6)	26%
Shrubland	0.1 (0.4)	3%
Fencerow	1.5 (3.6)	63%
Non-native Grassland	11.7 (29.0)	27%
Prairie	0.9 (2.2)	30%
Developed Land	7.1 (17.5)	5%
TOTAL UPLAND	262.0 (647.3)	--

¹600 meters is approximately 2,000 feet. Exhibit II-2 and Exhibit II-3 (all sheets) illustrate the corridor.

Note: The table includes impacts to upland vegetation cover types only (i.e., it does not include impacts to wetland-related cover types, or land purchased for mitigation and land-locked parcels whose cover type would not be changed). The **262.0** hectares (**647.3** acres) of total upland loss consists of the following: right-of-way impacts to upland plant communities (**234.3** hectares [**578.9** acres]); cover type conversions within the mitigation site (3.8 hectares [9.3 acres]); and cover type conversions within the landlocked parcels (**23.9** hectares [**59.0** acres]).

The proposed highway would convert a total of **262.0 hectares (647.3 acres)** of upland vegetation from one cover type to another (see Table IV-18). This total includes right-of-way takings, as well as conversions within the mitigation site and landlocked parcels, for upland vegetation cover types only (i.e., it does not include wetland-related cover types, or land purchased for mitigation and land-locked parcels whose cover type would not be changed). Most (**145.7 hectares or 359.9 acres**) of the plant communities would be converted to non-native grassland associated with the new right-of-way. The proposed highway would convert approximately 72.1 hectares (178.2 acres) to developed land (pavement, shoulders and median), **14.0 hectares (34.6 acres)** to upland forest, and 35.5 hectares (87.6 acres) to prairie.

The duration and severity of impacts depends on the success of mitigation measures and the time required for natural succession to develop pre-disturbance conditions of diversity and productivity. Replacement of shrubland and fencerow communities would require approximately three to 30 years. Replacement of oak-hickory upland forests would require from 100 to 500 years. For floodplain forests, replacement time would range from 10 to 30 years for black cherry-elm-hawthorn habitats, 30 to 60 years for willow-cottonwood-maple habitats, and 100 to 500 years for elm-oak-hickory habitats (Graber and Graber, 1976). Thus, loss of forested communities would be a long-term unavoidable adverse impact. Prairies and non-woody wetlands are uncommon in the project area. For plant communities such as agricultural land, hayfields, pasture, non-native grassland, and developed land, a reduction in ground cover would represent a minor impact because these cover types are relatively common outside the proposed right-of-way, or can be readily replaced (within one to three growing seasons). The loss of woody plant communities (i.e., forest, shrubland, and fencerow) and prairie would constitute a greater resource loss.

IV.H.2 Wildlife Resource Impacts

Habitat Loss

The analysis of project impacts on wildlife was based upon anticipated changes in the quality and quantity of habitat that would likely occur with the proposed highway. Habitat values were established considering resource availability, diversity and interspersions of cover types, replacement time required, level of existing utilization and disturbance, as well as overall size and continuity with other habitat areas. A majority (80 percent) of the project corridor is occupied by habitats disturbed by previous development or agricultural practices. Wooded habitat including upland and bottomland forest, as well as shrubland covers approximately 19 percent. The remaining habitats including wetlands and remnant prairie account for approximately one percent of the corridor.

Direct adverse impacts to terrestrial wildlife would occur principally through the removal or significant modification of habitat within the proposed roadway right-of-way. Disturbed habitats, such as agricultural land, non-native grassland and barren or developed land, currently occupy over 80 percent of the land area in the proposed alignment's right-of-way. While many species of wildlife use these habitats, these cover types are abundant in the region. They can be re-created relatively easily and have short replacement times. Conversely, the loss of habitats such as upland or floodplain forests, prairies, and wetlands would be more important from a wildlife standpoint. This is because these cover types are less abundant in the region, are much more difficult to create, and, if replaceable, are characterized by long replacement times. (See Section IV.H.1.)

Table IV-18 lists upland habitat loss by cover type. The proposed highway would remove approximately **30.8 hectares (76.1 acres)** of upland forest. Habitat loss would occur at numerous locations along the alignment, but especially in the western half of the corridor and in proximity to

the East Fork of the La Moine River. Given the relatively small percentage of the overall region occupied by this cover type, the loss of upland forest habitat is an important impact. Species most affected by these losses would be “edge species.” These include small mammals such as the white-footed mouse, fox squirrel, long-tailed weasel and red bat along with many birds, such as the red tailed hawk, indigo bunting, red-bellied woodpecker, and white-breasted nuthatch. Reduced habitat availability would affect larger, but common mammals such as the white-tailed deer. Although these species are common, they rely on this habitat to sustain populations. The loss of upland forest would be a long-term impact to wildlife species dependant upon this habitat type since mature upland forest can take from 100 to 500 years to replace. As part of the proposed highway, **14.0 hectares (34.6 acres)** of land would be set aside for woodland restoration and **60.8 hectares (150.3 acres)** of existing upland forest would be purchased and protected from existing grazing practices and future development.

Construction of the proposed highway would clear 6.8 hectares (16.9 acres) of mesic floodplain forest. The majority of this loss would occur at the two crossings of the East Fork of the La Moine River. This loss also would reduce populations of small mammals and birds using this habitat, such as the eastern phoebe, eastern wood peewee, American redstart, and a variety of woodpeckers. At least four species of bats are associated with floodplain forest in the project area. Floodplain forest accounts for approximately five percent of the project corridor. Like other forested habitats, its loss would be considered an important long-term impact since the regional availability of floodplain habitat is limited and replacement times for mature floodplain forest can be more than 100 years. Mitigation for these impacts would include the protection of 14.0 hectares (34.8 acres) of floodplain forest at six locations in the corridor.

Prairie impacts would total 0.9 hectare (2.2 acres). These prairie patches are too small to provide essential habitat for mammals or birds. However, some would provide important habitat for a variety of insects, including the regal fritillary.

The proposed highway would alter approximately **30.2 hectares (74.5 acres)** of grassland habitat including non-native grassland, hayfields and pastures. Grasslands comprise less than three percent of the project's corridor. This loss of habitat would affect grassland bird species such as the common yellowthroat, dickcissel, eastern meadow lark, field sparrow, and the northern bobwhite. Small mammals such as the prairie vole and southern bog lemming would be affected. The significance of this impact is lessened by the fact that grassland can be replaced in a relatively short time (one to 10 years for non-native grassland and 10 to 30 years for native grassland). This impact would be mitigated by the reestablishment of 17.3 hectares (42.7 acres) of native prairie within the new right-of-way between design stations 100+000 and 102+500, as well as development of 19.7 hectares (48.8 acres) of prairie at other mitigation sites.

The loss of 0.5 hectare (1.3 acres) of wet meadow would reduce habitat for many species such as mink, least weasel, meadow vole and leopard frogs. This habitat type represents less than one percent of the cover in the project corridor and is uncommon in western Illinois. Its loss is therefore relatively more important than losses to more common habitats. Impacts to wet meadow species would be mitigated over a five- to 30-year period through the creation of new wetland habitat as part of the wetland mitigation plan prepared for the proposed highway. (See Section IV.K)

Bell's vireo (*Vireo Belli*), an Illinois Watch species, was identified in the project area during breeding season in 1997 (Amundsen and Enstrom, 1998). This species nests in early successional fields, riparian areas and in shrubby vegetation. Habitat for the Bell's vireo was noted in a 5.3-hectare (13.1-acre) area near design station 103+500 (bird habitat area H-1 on Exhibit II-3b). The proposed highway's alignment was placed to minimize the loss of this habitat area. However, approximately 1.44 hectares (3.56 acres) of the western edge of the site would

be lost. Plantings of prairie and trees mentioned later in this chapter would mitigate for the Bell's vireo habitat disruption.

Disturbance

While the proposed highway could reduce habitat utilization for some species, especially in proximity to the new roadway, this impact would diminish rapidly with distance from the highway. The long-term effects on wildlife behavior resulting from various types and frequencies of noise are not well known. There is, however, evidence that many species may become acclimated to regular and predictable disturbances such as those emanating from a highway (Adams, 1994).

Operational Mortality

Impacts to wildlife populations because of vehicle collisions would be a potential consequence of the project. The majority of wildlife/vehicle collisions would involve common wildlife species such as whitetail deer, raccoon, Virginia opossum, and several of the more common bird species.

In the western half of the corridor between US 136 and US 67 north, approximately 20 percent of the alignment would be in cuts of 2.5 meters (8 feet) or greater. An additional 20 percent would be in fills of similar magnitude. In the eastern half of the corridor, from US 67 north to US 67 south, cuts and fills of this magnitude would occur in 13 percent and 18 percent of the alignment respectively. These grade differentials would contribute to the barrier effect of the highway on wildlife movement. Wildlife underpasses are proposed as part of the proposed highway to mitigate the severance of wildlife corridors. These structural measures are discussed in the next section, "Minimization and Mitigation of Impact."

Steps were taken to minimize disruption to existing wildlife corridors and fragmentation of habitat during the selection of the proposed alignment. While the proposed alignment of the western portion of the bypass generally follows the eastern edge of forested habitat, at certain locations it would fragment fingers of this habitat. It also would separate the grassland/cropland areas from upland forest, floodplain forest and the major water source of this area, Spring Creek. The northern and eastern portions of the proposed highway would pass mainly through agricultural fields. Two exceptions to this are: 1) between design stations 208+400 and 208+800 the northern segment of the proposed alignment would bisect a chain of wetlands and seeps; and 2) the crossing of the East Fork of the La Moine River would fragment a linear floodplain forest bordering the stream. Although no wildlife corridors were specifically identified as part of this project, animal migration typically occurs along these linkages.

The proposed project would traverse an area west of Macomb (stations 100+000 to 106+500; Exhibit II-2a to Exhibit II-2f) that contains ideal habitat (patches of forested land interspersed with agricultural land) for white-tailed deer. The location of the proposed roadway at this location would facilitate deer-vehicle collisions. Collisions could occur as the deer move across the highway between habitats. Other similar alignments west of Macomb would have the same consequences. There are approximately 10 deer per square mile in McDonough County. Because of this, deer are a major concern because of the frequency and severity of deer-vehicle collisions. Over the last ten years, there has been an overall continued increase in the frequency of deer-vehicle collisions. In a 12-year time span (1989 through 2000), deer-vehicle collisions on state marked or maintained routes in McDonough County have ranged from 31 (1989) to 92 (1998) in number. An average of 55 deer-vehicle accidents has occurred. In the three year period between 1998 and 2000, a total of 235 vehicular accidents involving deer were recorded in McDonough County. These accounted for 11 cases of personal injury and 224 cases of property damage.

Medium size (raccoon, opossum, and skunk) mammals are often struck by vehicles as they disperse throughout the project area. A year long study of vehicle/wildlife collisions along a 23 mile stretch of roadway in the Illinois River Valley (Green and Larsen, 2002) indicated the loss of raccoons (220), squirrels (61) and opossum (57). Recent studies by the US Environmental Protection Agency and the Highway Safety Information System indicated that wildlife/vehicle collisions have steadily increased nationwide over the last seven years. The study (Hughes and Saremi, 1994) reported collision rates of 0.07 to 1.16 collisions per kilometer per year.

The IDOT would provide mitigation for these impacts through the incorporation of wildlife underpasses along the proposed roadway. The mitigative measures are discussed in more detail in Section IV.H.3.

IV.H.3 Minimization and Mitigation of Impact

The proposed alignment would reduce wildlife habitat loss through both minimization of habitat loss, as well as habitat creation. The losses of cover types that are uncommon or require long replacement times were minimized through a detailed alternatives analysis process that emphasized the avoidance of wetlands, forests, and prairies (see Section III-B.). The mitigation steps described below would mitigate the loss of upland and floodplain forest, and prairie habitats.

Measures to Minimize Harm

Roadway design measures to minimize impacts to vegetation removal and wildlife habitat include:

- An alignment shift to the west has:
 - Reduced impact to habitat important to the Henslow's sparrow between design stations 101+000 and 102+000 (Exhibit II-3b).
 - Minimized impact to forest between design stations 101+800 and 102+250 (Exhibit II-3c).
- Selecting the proposed alignment over Alternate NW-3 reduced impacts to a large tract of upland forest (Exhibit II-3d).
- Using appropriate erosion and sediment control per the IDOT's *Standard Specifications for Road and Bridge Construction*.
- Limiting vegetation clearing and construction equipment operation to the right-of-way and construction easements.
- Disposing of non-marketable timber and brush in accordance with state regulations governing solid waste disposal.
- Responsibly applying deicing salts, herbicides and insecticide to hold pollution of water in the right-of-way to a minimum.
- Using good practices in mowing along the right-of-way.

- Extending both the eastern and western bridge crossings of the East Fork of the La Moine River a minimum of 3.1 meters (10 feet) on both sides of the river to allow the passage of wildlife.

Vegetation and Wildlife Habitat Mitigation

Focus has been placed on mitigating impacts to vegetation and wildlife habitat. Seven land-locked parcels and a 59.7-hectare (147.6-acre) parcel purchased from the City of Macomb would be used for impact mitigation. These parcels include portions of properties owned by Cross, Corson, Bland and Vogler, Brookhart Trust, McKee, and Runkle. Exhibit II-2c through Exhibit II-2f, Exhibit II-2i, and Exhibit II-3d illustrate the locations of these properties. Prairie restoration as proposed would include the site preparation, planting and management necessary to establish diverse prairie communities with a wide variety of both native grasses and forbs. Similarly, forest restoration would include the necessary site preparation, planting and management to encourage the establishment of a native forest community consisting of multiple species and strata.

Mitigation on each of these parcels is as follows:

- Cross Property (Land-locked Site 1, Exhibit II-2n). **1.5** hectares (3.6 acres) - prairie restoration.
- Runkle Property (Land-locked Site 2, Exhibit II-2k).
 - 0.7 hectare (1.8 acres) - forest restoration.
 - 0.4 hectare (1.0 acre) - upland forest protected from grazing and development.
 - 0.6 hectare (1.5 acres) - floodplain forest protected from grazing and development.
 - 0.2 hectare (0.5 acres) – wetland protected from grazing and development.
- McKee Property (Land-locked Site 3, Exhibit II-2i).
 - **0.9** hectares (**2.1** acres) – forest restoration.
 - **1.3** hectares (**3.2** acres) – upland forest protected from grazing and development.
 - 0.1 hectare (0.2 acres) – floodplain forest protected from grazing and development.
- Brookhart Trust North Property (Land-locked Site 4, Exhibit II-2f).
 - 3.8 hectares (9.5 acres) – prairie restoration.
 - 0.6 hectare (1.5 acres) – forest restoration.
 - 3.4 hectares (8.3 acres) – upland forest protected from grazing and development.

- 1.5 hectares (3.7 acres) – floodplain forest protected from grazing and development.
- 0.6 hectare (1.5 acres) – wetland protected from grazing and development.
- Brookhart Trust South Property (Land-locked Site 5, Exhibit II-2e).
 - 1.8 hectares (4.4 acres) – forest restoration.
 - 0.2 hectare (0.5 acre) - upland forest protected from grazing and development.
 - 0.5 hectare (1.2 acres) – floodplain forest protected from grazing and development.
- Bland and Vogler Property (Land-locked Site 6, Exhibit II-2d).
 - 12.3 hectares (30.5 acres) – prairie restoration.
 - 10.4 hectares (25.6 acres) – upland forest protected from grazing and development.

This parcel borders Mitigation Site 1, which is discussed below. These two sites combined provide a 64.7-hectare (160.0-acre) block of forest.

- Corson Property (Land-locked Site 7, Exhibit II-2c).
 - 1.9 hectares (4.7 acres) – forest restoration.
 - 0.7 hectare (1.7 acres) – upland forest protected from grazing and development.
 - 1.3 hectares (3.2 acres) – floodplain forest, located along Spring Creek, will be protected from grazing and development.
- Mitigation Site 1 (Exhibit II-3d).

Approximately 66.8 hectares (165 acres) of land on the east and west sides of the right-of-way from design station 103+320 to station 103+970 was purchased by the IDOT in early 2000 from the City of Macomb. Eighteen acres would be required for construction of the proposed roadway. The remaining 59.7 hectares (147.6 acres) would be used for the following habitat mitigation:

 - 0.5 hectare (1.2 acres) – prairie restoration.
 - 3.3 hectare (8.1 acres) – forest restoration.
 - 44.5 hectares (110 acres) – upland forest protected from grazing and development.
 - 10.0 hectares (25.0 acres) – floodplain forest protected from grazing and development.
 - 0.5 hectare (1.2 acres) – wetland protected from grazing and development.

Additional mitigation measures for vegetation replacement would include:

- Between design stations 100+000 and 100+600, the back half of the roadway right-of-way (4.0 hectares or 9.9 acres) would be planted in trees for forest restoration and the balance (4.0 hectares or 9.8 acres) would be planted to prairie.
- Between stations 100+600 and 102+500, the right-of-way (13.3 hectares or 32.9 acres) would be planted to prairie.
- Between stations 100+600 and 102+000, the right-of-way fence line (0.9 hectare or 2.1 acres) would be planted in thorny shrubs and trees.

In summary, mitigation would result in the following:

- 35.5 hectare (87.6 acres) – prairie restoration.
- **14.0** hectare (**34.6** acres) – forest restoration.
- **60.8** hectares (**150.3** acres) – upland forest protected from grazing and development.
- 14.0 hectares (34.8 acres) – floodplain forest protected from grazing and development.
- 1.3 hectare (3.2 acres) – wetland protected from grazing and development.
- 0.9 hectare (2.1 acres) – fence row restoration.

These mitigation areas would reduce the magnitude of project impacts. Plant communities created or restored as part of the proposed highway would provide greater diversity and higher quality than the affected habitat, given the extent of existing degradation in the forest understory and in the prairies. A site-specific plan for forest enhancement and/or prairie establishment and management would be developed during the design phase of the project.

Vehicle/Animal Collision Mitigation

Studies have shown that impacts to animal movements and incidents of vehicle-animal collisions can be lessened by the provision of wildlife underpasses. To mitigate for impacts to wildlife, a series of wildlife underpasses are proposed. **The crossings have been located in an attempt to connect valuable habitat on both sides of the roadway. The types of habitat connected by each wildlife crossing are listed in Table IV-19.** While the underpasses would be designed to maintain overall habitat **connectivity** for a variety of species, deer and medium sized mammals (raccoon, opossum, etc.) are of special interest. Fencing also would reduce **the number of incidents of vehicle-animal collisions.**

Two types of underpasses have been investigated and proposed for this project. First, reinforced concrete pipe (RCCP) would be utilized for medium size crossings. Medium underpasses would be 1.52 meters (5 feet) in diameter. Large underpasses would be either single span 30.5 meters (100 feet) long bridges or extensions of multiple span bridges. In areas of low fill depth or in cut sections, berms placed parallel to the roadway would be added at the ends of the culverts. The berm would increase the crossing's effectiveness by shielding the view of the traffic and reducing noise. Drawings of the animal crossings are found in Appendix E.

Table IV-19. Wildlife Crossings¹

Station	Crossing Size and Description	Habitat Connected
Northwest		
100+400	Large – Bridge over East Fork of the La Moine River – The bridge will extend on both sides of the river, allowing dry passage.	Upland forest and floodplain forest on the west to upland forest and floodplain forest on the east
101+150	Medium – 1.52 meters (5.00 feet) pipe with berms	Upland forest on the west to cropland/grassland on the east
101+375	Medium – 1.52 meters (5.00 feet) pipe with berms	Upland forest and pond on the west to cropland/grassland on the east
101+952	Large – Single span bridge	Upland forest and pond on the west to cropland/grassland and pond on the east
103+375	Large – Bridge carrying the freeway over CH 14 – The bridge will extend on both sides of CH 14 to provide crossing space. Fencing along CH 14 will be provided to prevent animals from getting onto the road at this location.	Spring Creek, upland forest, floodplain forest and grassland on the west to upland forest on the east
103+375	Medium – 1.52 meters (5.00 feet) pipe (no berm) – Placed under CH 14	Upland forest to upland forest
103+725	Medium – 1.52 meters (5.00 feet) pipe (no berm)	Upland forest and grassland on the northwest to floodplain forest, upland forest, grassland and pond on the southeast
104+025	Large - Single span bridge	Upland forest on the northwest to upland forest, floodplain forest grassland and a pond on the southeast
106+380	Large - Single span bridge	Upland forest and grassland on the northwest to upland forest, floodplain forest and pond on the southeast
Northeast		
208+625	Large - Single span bridge	Upland forest, grassland, cropland, wetland and pond on the north to floodplain forest, grassland, cropland, wetland and seeps on the south
205+575	Large – Bridge over East Fork of the La Moine River – The bridge will extend on both sides of the river, allowing dry passage.	Floodplain forest, upland forest and pond on the west to upland forest, floodplain forest and cropland on the east
205+125	Medium – 1.52 meters (5.00 feet) pipe with berms	Cropland and grassland on the west to upland forest on the east

¹See Exhibits II-2b, c, d, f, i, k, and l in Appendix E for crossing locations and vegetative cover types connected.

Twelve wildlife structures are recommended for the proposed highway. These wildlife underpasses were rated as either large or medium. Large crossings would be placed in the most environmentally sensitive locations where the potential for use rates appear to be the highest. Medium crossings would be placed in areas of likely usage. However, because of possible future development at these locations the medium crossings would be re-evaluated prior to construction. If development were to occur, these underpasses would not be useful or viable and therefore would not be constructed. The locations and description of the **proposed** wildlife crossings appear in Table IV-19. Additional studies concerning animal pathways are planned. The findings of possible future studies could result in changes in the number and locations of the wildlife structures.

IV.H.4 Geology and Soils

The proposed highway would be constructed through many areas with high erosion potential. Table IV-8 depicts the soils that occur in the construction area. Those soils with a slope designation of C or higher (four percent or steeper slopes) are considered highly erodible soils. These soils are subject to special erosion control procedures under a National Pollutant Discharge Elimination System (NPDES) construction permit. The natural drainage system, particularly in the headwater reaches, passes through very irregular terrain with steep slopes and ridges on silt loam soils that erode easily when vegetative cover is removed. *IDOT Standard Specifications for Erosion and Sediment Control* would be implemented throughout the project as well as special erosion control measures, as referenced in Table IV-20, in Section IV.I.

IV.H.5 Threatened and Endangered Species

The state-threatened Henslow's sparrow (*Ammodramus henslowii*) once was prevalent in prairie habitat throughout the state. It prefers large areas of tall, dense grassland, especially greater than 50 hectares in size. The species was found at two locations in the project corridor. The first location is a 46.5-hectare (115-acre) area along the west edge of the proposed right-of-way and south of Adams Street. The observed species were approximately 244 meters (800 feet) east of the proposed roadway alignment at this location (Exhibit II-3b). The second location is approximately 244 meters (800 feet) east of the proposed right-of-way, immediately north of Adams Street (Exhibit II-3c). During alternative studies, the proposed highway was shifted to the west as far as possible to minimize the loss of these habitat areas. The owner has mowed these fields since the 1998 sighting of the sparrows. In the 1999-breeding season, after the fields were mowed, no Henslow's sparrows were observed. Future use of the fields by Henslow's sparrows is dependent on the maintenance practices of the landowner. Therefore, the project will not impact the Henslow's sparrow.

In their Draft Environmental Impact Statement (DEIS) response letter of February 25, 2004 (see Appendix A), the US Fish and Wildlife Service concurred that the proposed project would have no effect on federally listed threatened or endangered species.

IV.I WATER QUALITY/RESOURCES IMPACTS

This section discusses the potential impact of the proposed alignment on water resources and their quality. The construction, operation, and maintenance of the new highway would potentially affect surface water quality in several ways. Short-term construction impacts could result from erosion and siltation generated during clearing, excavation and filling activities. Long-term operation and maintenance could affect surface water quality through the runoff of deicing

chemicals and traffic related pollutants such as oils, greases, rubber, etc., generated by vehicular traffic. The proposed highway would have minimal impacts to groundwater quality.

IV.I.1 Surface Water Resources/Water Quality

Construction Impacts

Short-term construction impacts would most directly result from the clearing of vegetation, mass grading, excavation and filling required for highway construction. These activities substantially increase the potential for soil erosion and could result in elevated turbidity levels in nearby surface waters. Water quality downstream from construction zones could experience increased nutrient levels, suspended solids, and lowered oxygen concentrations. Immediately downstream, violations of water quality standards could occur, but would be short-term. Suspended solids and related turbidity could affect the feeding and spawning of fish. Sediments can engulf fish and invertebrate eggs and larvae. Increases in suspended solids also could result in elevated levels of coliform bacteria, total phosphorous, heavy metals, and organic chemicals such as pesticides and herbicides, since these substances are frequently adsorbed to the surface of organic solids. These impacts would be the most severe immediately downstream of construction areas or direct discharge points and would dissipate with time, as well as distance downstream.

During construction, it is anticipated that equipment would need to cross the East Fork of the La Moine River. This would be accomplished via a gravel causeway, constructed perpendicular to the channel and providing culverts to accommodate normal flow. Impacts to water quality would be short-term and limited to the effects of disturbed sediments and resulting turbidity created by the placement of clean gravel. Fish will avoid direct impact and be subjected to a minor pulse of suspended sediments not unlike that experienced from agricultural runoff during heavy storm events. Some aquatic invertebrates would be covered by the causeway and the re-settling materials. However, populations would be shortly re-stored. Bridge piers would be constructed outside of the river channel at the two crossings of the East Fork of the La Moine River. In order to minimize water quality impacts related to construction, the contractor would implement erosion and sediment controls as an integral part of the construction process in accordance with the IDOT's *Standard Specifications for Erosion and Sediment Control*.

Deeply incised and heavily wooded channels, draining highly erodible and unstable soils characterize the natural drainage system in the project area. Most of these drainageways are first or second order intermittent streams carrying flow only during and immediately after rain events. The proposed alignment would traverse the upper reaches of many of these channels. The potential for erosion is therefore high. **Near design station 208+625, construction of the proposed roadway would require the realignment of approximately 150 feet of a small intermittent stream. The channel would be regraded to provide a capacity equivalent to the existing ditch and the bank would be revegetated.** Like the two river crossings the contractor would implement erosion and sediment controls as an integral part of the construction process at new drainage structures in accordance with the IDOT's *Standard Specifications for Erosion and Sediment Control*. Table IV-20 lists key locations along the proposed alignment where special considerations would be necessary for erosion and sediment controls.

The proposed roadway would cross Deer Lake on an embankment approximately 110 meters (350 feet) wide, which includes the four-lane roadway and berm. Clean, rock fill would be deposited in the lake to create a foundation for the road. During construction, turbidity levels would increase because of the suspension of particulate materials and the disturbance within the lake bed. This impact would be temporary, since suspended materials would settle out quickly and the embankment slopes would be lined with stone to minimize erosion from wave action.

**Table IV-20. Erosion and Sediment Controls Locations
Needing Special Consideration**

Design Station¹	Resource	Activity to be Controlled
100+250 to 100+800	East Fork La Moine River and Wetlands 56 and 58 (western crossing)	Clearing of riparian vegetation, construction of bridge approaches
101+200 to 101+400	Wetland 12a (Pond)	Fill and grading for road construction
101+660 to 101+800	In-stream impoundment and tributary	Overpass construction for 1250N
102+000 to 102+200	Headwater ravines tributary to East Fork	Vegetation clearing, embankment construction and placement of drainage structures
102+600 to 103+300	Wetlands 7a and 6a (tributary to Spring Creek)	Fill and grading for roadway embankment
103+100 to 103+300	Flood Plain of Spring Creek	Fill and grading for roadway embankment
103+700 to 104+500	Wooded ravine tributary to Spring Creek and Wetland 44	Vegetation clearing, embankment construction and placement of drainage structure
500+600 to 500+900 and 105+200 to 105 +500	Wooded tributary to Spring Creek	Vegetation clearing, construction of overpass approach and placement of drainage structure
105+900 to 106+600	Wooded ravines tributary to Wigwam Hollow and Wetland 35	Vegetation clearing, embankment construction and placement of drainage structures
20+100 to 20+500 (Springlake Road)	Tributaries to East Fork	Vegetation clearing and construction of overpass approval and placement of drainage structures
208+100 to 208+800	Wetlands and Seeps 2a and 25	Vegetation clearing, construction of overpass approach, placement of drainage structure and stream relocation
207+100 to 207+400	Tributary and Wetland 22	Construction of overpass, across road and placement of drainage structure
206+50 to 206+300	Wetland 14	Construction of roadway enhancement
205+600	East Fork La Moine River Wetlands 3a and 4a (eastern crossing)	Clearing of riparian vegetation, construction of bridge approaches

¹The design stationing used to identify locations along the design of the proposed highway is shown on Exhibit II-2 (all sheets) and Exhibit II-3 (all sheets). The actual limits of protection would be determined during the final design of the project, as appropriate, to fully protect the resources identified.

Construction is expected to be accomplished by incorporating causeways across the lake on the outer limits of the proposed roadway embankment. These causeways would be approximately 3.7 meters (12 feet) wide at the top to provide access across the lake during construction. The causeways would be constructed from clean rock fill using a 3:1 and variable slope. The top of the fill would be approximately 0.9 meter (3 feet) above the water level. The intended use of these causeways is to limit the area of lake bed disturbance to the area of construction between the causeways. Culverts would be placed under each causeway, below the water surface, to permit equalized water flow between both sides of the roadway. The total area of lake bed disturbance would be limited to the foot print of the structure, or approximately 0.63 hectares (1.6 acres).

Operational Impacts

The number of vehicles using a facility is the single strongest predictor of pollutant load. Research has shown that in rural areas, roadways with Average Daily Traffic (ADT) of less than 30,000 vehicles per day cause no measurable impact to water quality. The ADT for the proposed alignment would range from 3,200 to 4,200 vehicles per day in the year 2020. By using an open drainage system with surface runoff passing through vegetated swales, the operation of the highway would not have a measurable effect on water quality.

Since Deer Ridge Lake lies at a higher elevation than most of the surrounding terrain, surface drainage from the roadway would be directed away from the lake. Therefore, long-term operation and maintenance impacts would be minimal.

Maintenance Impacts

The IDOT maintains a "bare pavement" policy during the winter months to ensure motorist safety and vehicular mobility. Deicing agents, such as sodium chloride and calcium chloride, singularly or in combination, are added to roadway surfaces in order to prevent snow and ice from bonding to the pavement. The average salt usage within IDOT District 4 for 1994 to 1996 was 5.5 tons per lane-mile. Case studies and order-of-magnitude estimates indicate that roadway surfaces and adjacent drainageways at times can contain extremely high concentrations of salt. In practice, the maximum concentration reaching receiving waters is much lower because of soil absorption and the high dilution associated with snowmelt and surface water volumes. This information suggests that maximum water quality impacts would occur where highway drainage discharges directly into surface waters and would diminish rapidly downstream. The application of roadway deicing salts is also a seasonal activity, limited to a general period between November and March, and dictated by the frequency and duration of individual storm events.

Direct discharges of surface runoff would occur at the two crossings of the East Fork of the La Moine River. Less direct discharges would occur at the intersection of the new roadway and minor drainageways. Approximately 100 meters (328 feet) south of CH14/1350, a proposed culvert would convey surface drainage and roadway runoff toward Spring Creek. Although no direct outlet would be constructed from the new roadway, since this is a low point in the roadway profile, surface runoff would flow through vegetated swales on either side of 2.1 kilometers (1.3 miles) of the road, ultimately draining into Spring Creek. Using a worst-case scenario, total chloride concentrations were estimated for Spring Creek. Assuming sodium chloride (NaCl) was applied at three times the normal rate, all salt reached Spring Creek, and normal stream dilution during a storm event, the maximum salt concentration experienced in Spring Creek would be 140 milligrams per liter (mg/l). While representing a short-term elevation over normal concentrations, this level would diminish rapidly and would remain well below the Illinois water quality standard of 500 mg/l.

IV.I.2 Groundwater Quality

The proposed alignment would have minimal impacts to groundwater quality. Most domestic and commercial wells in the project area draw from the Keokuk–Burlington limestone formation. This aquifer lies at depths of 45 to 135 meters (147 to 443 feet). Other shallow wells draw from sand and gravel aquifers 6 to 23 meters (19.7 to 75.4 feet) deep. The risk for groundwater contamination is low to moderate throughout the corridor, except where the facility crosses alluvial deposits, such as the floodplain of the East Fork of the La Moine River, where it becomes high (Berg and Kempton, 1984). Soils in these areas generally have a shallower depth to water table and high permeability.

Records from the Illinois State Water Survey and the IEPA indicate one domestic well may lie within 60 meters (200 feet) of the proposed right-of-way. This well is on the southwest end of the proposed alignment on the J. Friday property. It has a recorded depth of 92 feet. As part of the design of the project, engineers would give special attention to measures to mitigate any potential adverse effects on this site. No highway support facilities related to either construction (equipment staging areas) or operation (material or equipment storage) would be located within a wellhead setback zone.

The 1987 Illinois Groundwater Protection Act was implemented to protect groundwater resources from degradation and prevent difficult and expensive cleanup efforts. The Act allows for the establishment of both regulated groundwater recharge areas and groundwater protection areas. At this time, there are no sole source aquifers in Illinois. No regulated groundwater recharge areas are within the corridor.

IV.J FLOOD PLAIN IMPACTS

IV.J.1 Impacts and Avoidance

In order to evaluate the potential highway encroachment on base flood plains by the proposed alignment, study engineers assessed the project in accordance with state and federal regulations. Based on a review of the available Federal Emergency Management Agency Flood Insurance Study -- Flood Boundary Maps and the Flood Insurance Rate Maps, project engineers identified three potential flood plain encroachments. Exhibit II-3b through Exhibit II-3d (East Fork La Moine River and Spring Creek), Exhibit II-3i (unnamed creek), and Exhibit II-3k (East Fork La Moine River) show the locations of the flood plains and their relation to the right-of-way of the proposed alignment. Table IV-21 presents the characteristics of the encroachments.

In Illinois, encroachment in the flood plain is limited to that which would cause only an insignificant increase in flood height (IDOT, 1973). For rural areas, the Illinois Division of Water Resources recommends that the flood level increase for the 100-year frequency discharge associated with a floodplain encroachment be limited to no more than 1.0 feet (305 millimeters) for transverse encroachments and 0.5 feet (152 millimeters) for longitudinal encroachments. The limits of the Illinois regulatory floodway would be determined during project design for each stream crossing.

The net fill volume that would be placed into the flood plain by the proposed highway (see Table IV-21), as well as the area and type of land impact within areas where the flood plains would be filled, were calculated for each crossing. For the northwest crossing of the East Fork La Moine River (stations 100+265 to 100+485), the net fill volume would be 20,988 m³ (27,451 yd³), and 2.9 hectares (7.2 acres) of forest and 1.1 hectares (2.8 acres) of agricultural land in the flood

Table IV-21. Flood Plain Encroachments

Stations ¹	Stream	Range of Width of Flood Plain in meters (feet)	Type of Encroachment	Length of Right-of Way Encroachment in meters (feet)	Right-of Way Floodplain Encroachment in hectares (acres)	Increase in Floodwater Elevation	Net Fill Volume Being Placed in Flood Plain (m ³ /yd ³)
100+265 to 100+485	East Fork La Moine River	130 to 210 (426 to 689)	Transverse	220 (722)	4.04 (9.98)	no increase	20,988 / 27,451
103+205 to 103+245	Spring Creek	100 to 150 (328 to 492)	Longitudinal	40 (131)	0.06 (0.15)	no increase	1,398 / 1,829
205+385 to 205+600	East Fork La Moine River	150 to 300 (492 to 984)	Transverse	215 (705)	2.69 (6.65)	0.02 meter (0.07 foot) for 50-year design storm 0.03 meter (0.1 foot) for 100-year design storm	17,347 / 22,690

¹Exhibit II-3 (all sheets) shows the station numbering applied to the centerline of the design of the proposed alignment.

plain would be used. At the Spring Creek crossing, the net fill volume would be 1,398 m³ (1,829 yd³), and 0.06 hectare (0.15 acre) of forested land within the flood plain would be used. At the northeast crossing of the East Fork La Moine River (stations 205+385 to 205+600), the net fill volume would be 17,347 m³ (22,690 yd³), and 0.35 hectare (0.86 acre) of forested land would be used.

As noted in Table IV-21, the expected increases in floodwater elevation would be well within the criteria of the Illinois Division of Water Resources. The construction of the proposed alignment will cause a minimal increase in flood heights and flood limits. These minimal increases would not result in any significant adverse impacts on the natural and beneficial floodplain values; they would not result in any significant change in flood risks or damage; and they do not have significant potential for interruption or termination of emergency service or emergency evacuation routes; therefore, it has been determined that this encroachment is not significant.

As discussed in Section III.B.3, "Alignment Studies," the IDOT considered alternative bypass corridors on all sides of the City of Macomb. In all cases, flood plains were crossed. This is indicative of the presence of the East Fork of the La Moine River, which passes from the southwest side of Macomb to the northeast, and its tributaries. Thus, the avoidance of all flood plain encroachments by a Macomb bypass is not practicable.

The longitudinal floodplain encroachment along Spring Creek was unavoidable with the proposed alignment. The chosen alignment was one of several evaluated. It performs the best when considering the full range of analysis, including reducing noise impacts and maintaining a small sheep operation that benefits Western Illinois University students. In addition, the chosen alignment was developed to lessen impacts in the vicinity of Deer Ridge Lake, including crossing a narrow part of the lake (which minimizes the length of the causeway required across the lake) and avoiding a planned subdivision adjacent to the north side of the lake to the east of the proposed roadway.

IV.J.2 Flood Plains – Only Practicable Alternative Finding

Based on the above considerations, it is determined that there is no practicable alternative to the proposed construction in flood plains, and that the proposed action includes all practicable measures to minimize harm to these resources.

IV.K WETLAND IMPACTS

The proposed highway would affect wetlands in scattered locations where the right-of-way crosses the East Fork of the La Moine River and its tributaries. The proposed highway would affect five wetlands (1a, 3, 6a, 7a, and 58). The total wetland loss requiring mitigation would be **0.76** hectare (**1.87** acres). A minimum of **2.79** hectares (**6.89** acres) of wetland compensation would be required. Under the implementing rules of the Illinois Interagency Wetland Policy Act, off-site mitigation ratios (3:1; 4:1) apply. A mitigation site west of Macomb (Hancock County) along the La Moine River is currently under development by IDOT. Short- and long-term direct impacts from filling, excavating, or draining wetlands during construction of the new road, grade separations, and access roads would modify the structure, plant composition, and extent of wetlands. Long-term permanent losses would occur where the project would fill a wetland. Short-term impacts would occur where construction equipment would temporarily affect a wetland not otherwise filled or drained.

IV.K.1 Long-Term Wetland Impacts

Table IV-22 summarizes wetland loss by location and type. The new roadway would affect all or part of five of the 33 wetlands within the 600-meter project corridor. Total wetland loss would be **0.76 hectare (1.87 acres)**. In addition, the portion of Wetland 3 that would be under a bridge would be considered a permanent (long-term) loss. The paragraphs that follow describe the impact at wetlands 1a, 3, 6a, 7a, and 58. Wetland characteristics are identified in Tables II-9 and II-10.

Wetland 1a

The proposed highway would **affect 0.09 hectare (0.22 acre) at the southern end of** Wetland 1a, a wet meadow along the northern leg and east of US 67. **However, 76 percent of the wetland would remain intact; thus, there would be a minimal effect on the wetland's** functional values (*i.e.*, surface water storage and wildlife habitat). Wetland 1a is shown on Exhibit II-2i.

Wetland 3

In the northeast portion of the project, the new roadway would cross the East Fork of the La Moine River. Construction of a new bridge would require the placement of support piers and the clearing of approximately 0.08 hectare (0.19 acre) of floodplain forest. Wetland loss would be limited to the area beneath the bridge. Wetland 3 is shown on Exhibit II-2k.

Wetland 6a

On the west leg of the proposed highway, the right-of-way would affect less than 0.17 hectare (0.41 acre) at the eastern extent of Wetland 6a (a wet meadow area connected to Wetland 7a). Forty one percent of the wetland would remain intact; thus, there would be a substantial effect on the wildlife functional value. Wetland 6a is shown on Exhibit II-2c.

Wetland 7a

The proposed highway would bisect Wetland 7a, a floodplain forest/sedge meadow wetland **with diverse vegetation (*i.e.*, a floristic quality index value of 21.8). Essentially, all 0.36 hectare (0.90 acre) of this wetland would be used by the proposed highway.** Functional values for nutrient removal/transformation and production export would be eliminated. Over the last several years, portions of this site have been disturbed by sand excavation. This wetland site will be re-evaluated prior to construction to determine its jurisdictional status and floristic quality index. Wetland 7a is shown on Exhibit II-2c.

Wetland 58

The proposed roadway would affect 0.06 hectare (0.15 acre) of the southern portion of the forested wetland. The small impacts will have minimal impact on the flood flow alternative and sediment stabilization functions. Wetland 58 is shown on Exhibit II-2b.

IV.K.2 Short-Term Wetland Impacts

Short-term impacts would occur at the east crossing of the East Fork La Moine River. Construction equipment would require access to locations where bridge piers would be constructed. These activities would result in soil compaction and disturbance to vegetation in defined access ways. Following construction, these areas would be restored.

Table IV-22. Estimated Wetlands Loss by Location

INHS Site No. ²	Description	Size hectares (acres)	Wetland Loss ¹ in hectares (acres)		Total Impact Hectares (acres)	Diminished Functional Values
			PEM	PFO		
W1a	Wet meadow, north leg of project and east of US 67	0.38 (0.93)	0.09 (0.22)		0.09 (0.22)	Surface water storage, wildlife habitat
W3	Floodplain forest bordering East Fork of the La Moine River	Linear, extending along both sides of stream		0.08 (0.19)	0.08 (0.19)	Flood storage, bank stabilization
W6a	Wet meadow adjacent to W7a, west leg	0.24 (0.59)	0.17 (0.41)		0.17 (0.41)	Wildlife habitat
W7a	Diverse floodplain forest/sedge meadow adjacent to W6a on west leg	0.36 (0.90)		0.36 (0.90)	0.36 (0.90)	Nutrient removal/transformation, wildlife habitat, production export
W58	Floodplain forest	1.01 (2.50)		0.06 (0.15)	0.06 (0.15)	Flood flow alteration, sediment stabilization
	TOTAL		0.26 (0.63)	0.50 (1.24)	0.76 (1.87)	

¹from Cowardin et. al., 1979

PEM = flooded, emergent, palustrine wetland

PUB = flooded, unconsolidated bottom, palustrine wetland

PFQ = temporarily flooded, broad-leaved deciduous, forested, palustrine wetland

²Site locations and numbers shown on Exhibit II-2b through Exhibit II-2f and Exhibit II-2i through Exhibit II-2k.

IV.K.3 Avoidance

Based on the analysis presented in this section and the following sections, there are no practicable alternatives to the proposed construction in wetlands. In addition, the proposed highway includes all practicable measures to minimize harm to wetlands that could result from such use, including mitigation.

The design and development of the proposed highway has followed and would continue to follow a three-step impact-mitigation process prioritized as:

1. Impact avoidance (28 of the 33 wetlands within the project corridor would be avoided).
2. Impact minimization.
3. Compensation, including repair, rehabilitation, and restoration of affected areas and replacement of wetland habitats.

US 136 West of Macomb to US 67 North of Macomb

In the course of evaluating alignment alternatives west of Macomb and north of US 136, the bypass was placed to avoid Wetland 55 (see Exhibit II-2b). Shifting the alignment to the east or west to avoid Wetlands 6a and 7a (**see Exhibit II-2c**) was considered, however other substantial impacts would have resulted and the alternative alignments were considered not practicable.

US 67 North of Macomb to US 136/US 67 East of Macomb

East of US 67, the study team placed the project to avoid seep Wetlands 25, 26, and 27 south of the proposed alignment. Their unique hydrology would make these wetlands impossible to mitigate in-kind. This shift also eliminated the need for a second crossing of a tributary to the La Moine River. **Since the release of the DEIS, the alignment was shifted slightly to the south at the McKee property, which decreased the use of Wetland 1a by 0.29 hectare (0.71 acre) without affecting the seep wetlands.** Shifting the alignment north to avoid Wetland 1a was not practical because it would impact Wetland 2a and result in four additional residential displacements. Thus, this alternative alignment was rejected as not practicable.

South Corridor

As described in Section III.B.3, the study team also examined a South Corridor as an alternative to placing the bypass west and northwest of Macomb. An alignment in the South Corridor would affect a smaller wetland area. The corridor, however, would not be practicable because:

- It would have two to six stream crossings and 14 tributary crossings.
- Farm parcel, right-of-way and agricultural impacts associated with any of the South Corridor alternatives would be 50 to 100 percent greater.
- The proposed alignment would better serve traffic.
- It would be nearly 50 percent longer and 50 percent more expensive to construct.

No-Action Alternative

The wetland impacts associated with the proposed alignment would not occur with the No-Action Alternative. Travelers would continue to use existing roads. The project purposes related to

regional system linkage, improving traffic operations on the local transportation network, and economic development, however, would not be achieved. Thus, the IDOT does not consider the No-Action Alternative to be a practicable solution to the transportation needs of the Macomb area.

IV.K.4 Measures to Minimize Harm

Where avoidance is not possible, impacts would be minimized by longer bridge structures at the East Fork of the La Moine River, the application of best management practices during construction, and the protection of wetland resources on four land-locked parcels.

Lowering the profile of the roadway minimized impacts to Wetland 6a ~~and 7a~~ by limiting the amount of fill required. Positioning the bridge to provide a right angle crossing at the narrowest point of the wetland reduced the potential for impacts to Wetland 3. Minimization also resulted from bridging the entire wetland, limiting impact to the area required for the bridge piers.

Best management practices would include limiting the construction zone and maintaining existing drainage patterns. Before commencement of construction activities, contractors would place erosion control fencing within construction limits. Contractors would minimize impacts from silt and sedimentation through adherence to erosion control measures presented in the IDOT's *Bureau of Construction and Design and Environmental Policy and Procedure Memorandum*.

Finally, the purchase of various properties adjacent to the proposed alignment would protect 1.2 hectares (3.0 acres) of existing wetlands from grazing and/or future development: Protected wetlands would include floodplain forest, sedge meadow, wet meadow and pond communities.

IV.K.5 Compensatory Mitigation

The IDOT would design, construct, and manage wetlands to compensate for wetland impacts. Compensation would occur in accordance with increased ratios established under the Interagency Policy Act of 1989.

The proposed project is considered a Standard Review Action under the IDOT Wetlands Action Plan as approved by the Illinois Department of Natural Resources (IDNR). As a Standard Action, the project is required to be coordinated with the IDNR, a Wetland Compensation Plan must be prepared and approved by the IDNR, and the project is subject to higher mitigation ratios. Because the proposed mitigation area is considered off-site (more than a mile from project impacts) and in-basin, the following mitigation ratios apply. Impacts less than 0.5 acres require a mitigation ratio of 2.0 to 1. Impacts of 0.5 acres or greater require a mitigation ratio of 4.0 to 1.

Special mitigation ratios apply for any size impact if the wetlands contain endangered and threatened species, essential habitat for endangered and threatened species, the site is listed as an Illinois Natural Area, or the site has a floristic quality index of over 20. In these cases, a mitigation ratio of 5.5 to 1 applies. Table IV-23 presents the compensation required by each wetland impact.

Wetland impacts associated with this project would be compensated for at a mitigation site west of Macomb. This site in Hancock County is situated along the La Moine River and is currently under development by the IDOT.

Table IV-23. Required Compensation for Wetland Loss by Affected Wetland

INHS Site No.	Total Wetland Loss – Hectares (acres)	Compensation Rate	Required Compensation Hectares (acres)
W1a	0.09 (0.22)	2.0:1	0.18 (0.44)
W3	0.08 (0.19)	2.0:1	0.16 (0.38)
W6a	0.17 (0.41)	2.0:1	0.34 (0.82)
W7a	0.36 (0.90)	5.5:1	1.99 (4.95)
W58	0.06 (0.15)	2.0:1	0.12 (0.30)
TOTAL:	0.76 (1.87)		2.79 (6.89)

IV.K.6 Wetlands – Only Practicable Alternative Finding

Based on the above considerations, it is determined that there is no practicable alternative to the proposed construction in wetlands, and that the proposed action includes all practicable measures to minimize harm to these resources.

IV.L HAZARDOUS AND NON-HAZARDOUS WASTES

A Preliminary Environmental Site Assessment (PESA) for special waste was conducted by the Illinois State Geological Survey (July 2001). The PESA site forms and response form are included in Appendix A. The assessment concluded that the proposed alignment could involve sites potentially impacted with regulated substances. Further, it was determined that two of the sites can be avoided. The IDOT would manage and dispose of the areas of contamination in accordance with applicable Federal and State laws and regulations, and in a manner that would protect human health and the environment.

IV.L.1 Hazardous Waste

The two PESA-identified sites that cannot be avoided are Moore Equipment, Inc. and Smith Airfield. (See Exhibit II-3n.) The Moore site contained a solvent that, if determined to have leaked or spilled, would classify the contamination as an F-listed spent solvent (hazardous waste). The airport may also have used solvent as a part cleaner. The nature of contamination to the soil and water is not known. The proposed alignment would neither involve nor affect a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) site.

IV.L.2 Non-Hazardous Waste

In addition, both PESA-identified sites could involve petroleum contamination from leaking underground storage tanks. The nature of the involvement is not known. The extent is not known. Further testing to determine the extent of contamination would be completed if any potentially contaminated areas fall within the required right-of-way.

IV.M PERMITS/CERTIFICATIONS

Section 404 of the Clean Water Act regulates the deposition of fill or dredged material into Waters of the United States. A Section 404 Permit from the US Army Corps of Engineers is required for the construction, expansion, modification, or improvement of linear transportation crossings in waters of the US, including wetlands. Nationwide Permit (NWP) 14, reissued effective March 2002, is applicable if the activity does not cause a loss of greater than 0.2 hectare (0.5 acre) of waters of the U.S. in non-tidal waters and the length of fill is 61 meters (200 feet) or less. Where a road segment has multiple crossings of streams (several single and complete projects) the Corps considers whether it should use its discretionary authority to require and Individual Section 404 Permit. If greater than 0.2 hectare (0.5 acre) is affected or the length of fill is greater than 61 meters (200 feet), an Individual Section 404 Permit is required. Table IV-24 lists the seven construction locations, and impacts at those sites.

Table IV-24. US Army Corps of Engineers Dredge and Fill Permit Locations

Design Station ¹	Resource	Impact	Likely Permit Type
100+400	East Fork La Moine River	Potential for bridge piers in the stream channel	NWP 14
102+650	Wetlands 6a and 7a (tributary to Spring Creek)	Wetland fill area of 0.53 hectare (1.31 acres)	Individual Permit
500+800 (950E)	Wooded tributary to Spring Creek	64-meter (210-foot) culvert extension	NWP 14
104+035	Wooded tributary to Spring Creek	133-meter (436-foot) culvert	Individual Permit
208+600	Wetland 1a	Wetland fill area of 0.09 hectare (0.22 acre)	Individual Permit
205+600	East Fork La Moine River and Wetland 3	Potential for bridge piers in the stream channel and wetland fill area of 0.08 hectare (0.19 acre)	NWP 14
100+375	Wetland 58	0.06 hectare (0.15 acre)	NWP 14
	TOTAL WETLAND IMPACT	0.76 hectare (1.87 acres)	

¹The design stationing used to identify locations along the design of the proposed alignment is shown on Exhibit II-2b, c, d, i, and k.

States are granted authority to review activities in waterways and wetlands and to issue water quality certifications, under Section 401 of the US Clean Water Act. A Section 401 Water Quality Certification is issued by the Illinois Environmental Protection Agency (IEPA) for all activities requiring a dredge and fill permit. Under the state's anti-degradation policy, individual water quality certification would be subject to public review. A project description and results of the anti-degradation analysis would be posted on the IEPA website for comment. Additional state agency requirements are established under the Illinois Interagency Wetland Policy Act of 1989. This act pertains to state-funded actions affecting wetland areas and establishes both procedures for agency coordination and a wetland mitigation policy for the State of Illinois. See Section IV.I.1 and Section IV.K for additional discussion of the impacts to water resources and wetlands from the proposed alignment.

The proposed highway would result in the disturbance of 0.4 or more hectares (one or more acres) of total land area. Accordingly, a NPDES permit for stormwater discharges from the construction sites would be needed. Permit coverage for the project would be obtained either under the IEPA General Permit for Stormwater Discharges from Construction Site Activities (NPDES Permit No. ILR10) or under an individual NPDES permit. Contractors would follow the requirements applicable to such a permit, including the preparation of a Stormwater Pollution Prevention Plan. Such a plan would identify reasonably expected potential sources of pollution that could affect the quality of stormwater discharges from the construction site. It also would describe and ensure the implementation of practices used to reduce pollutants in the discharges associated with construction site activity. The plan also would help ensure compliance with the terms of the permit. Construction activities related to the project are discussed in Section IV.P.

If the removal of any underground storage tanks is required by the project, an Underground Storage Tank Permit must be obtained from the Office of the State Fire Marshall. See Section IV.L for information on hazardous and non-hazardous special wastes.

An Open Burning of Landscape Waste Generated by Land Clearing Activities permit is required from the IEPA for any open burning of landscape waste generated from land clearing activities precipitated by road construction projects.

IV.N VISUAL IMPACTS

Construction of the proposed alignment would affect views from several residences and a prairie restoration area. The greatest substantial visual change would occur for homes at 1250N/Adams Street, two homes south of CH 14/1350N, US 67 (north of Macomb), Bower Road/1400E, 1400N, and the BNSF Railroad and University Drive/1300N. At these locations, fills associated with the project would be a substantial new visual feature for nearby homes.

IV.N.1 Visually Sensitive Locations

Visual impacts from the proposed highway are not substantial. The project corridor crosses the viewshed of several homes. Most residences are isolated farm structures. Section II.J defined three clusters of homes near the project area. Homes with views of the proposed alignment are found at: US 136 (west of Macomb), 1250N/Adams Street, Deer Ridge Lake and planned subdivision, two homes south of CH 14/1350N, the 950E and Tower Road area, 1000E, Springlake Road and 1500N, US 67 (north of Macomb), Bower Road/1400E, 1400N, University Drive/1300N, and US 136/US 67 (east of Macomb). Viewers at the Lake View Prairie Restoration Area would see the project. Exhibit II-3 shows these locations. These locations are visually sensitive because of their viewer characteristics.

IV.N.2 Visual Character of the Proposed Alignment

Design features of the proposed alignment include: cuts in and fills on the existing terrain; bridges and approach fills at local road crossings; the paved surface; and right-of-way fencing. The project would clear existing vegetation (described in Section IV.H.1). Grasses would replace existing vegetation except at habitat loss mitigation areas described in Section IV.H.3. The locations of cuts and fills vary along the project. The discussion of effects in the next section describes them. The view of the project corridor from the proposed alignment is described in Section II.J.

IV.N.3 Visual Effects

The proposed alignment would have the following visual effects on **36** homes and the Lake View Prairie Restoration Area at the sensitive locations identified above:

- US 136 (West of Macomb). The proposed alignment includes two additional ramps at the proposed IL 336 project's interchange with IL 136. The freeway lanes of the proposed alignment would be in cut and not readily visible from nearby homes, east and west of the alignment. The right-of-way is wooded and the project would remove some trees. (See Exhibit II-3a.)
- 1250N/Adams Street. Six rural homes along this road overlook a farmed valley. The proposed alignment would substantially change the views of that valley. The project would move across the valley on a high fill. The elevation of the fill would drop as the project approaches 1250N/Adams. At 1250N/Adams, the bypass would be roughly at the existing grade and 1250N/Adams would go over the bypass on a bridge approached on fill. The bridge and its approach fill would contribute to the substantial change in views in this area. (See Exhibit II-3b.)
- Deer Ridge Lake and Subdivision. East to west views from the proposed lake-side subdivision and the lake would be interrupted by a causeway across the lake. ~~A direct view of the road would be blocked by a proposed berm along the eastern edge of proposed roadway.~~ The subdivision is platted only east of the causeway. (See Exhibit II-3c.)
- South of CH 14/1350N. The proposed alignment generally would be on fill between 1250N and CH14/1350N. From the **three** existing homes in this area, viewers would see the road and the fill. (See Exhibit II-3c.)
- 950E, Tower Road, and 1000E Area. The proposed alignment would be either in a shallow cut or at-grade in this area. Tower Road would cross the project on a bridge approached on fill. The homes closest to the road and the Tower Road fill would be displaced. The project would cause minimal change to views from other more distant rural homes in the area since it would be near the existing ground level and the project would take few trees in this area. (See Exhibit II-3e and Exhibit II-3f.)
- Lake View Prairie Restoration Area. At this location, the proposed alignment would be built at roughly the existing ground level. A bridge with fill approaches would be built to bring Springlake Road over the project. The bridge and fill would be introduced to views from the Lake View Prairie Restoration Area and four homes south of Springlake Road. (See Exhibit II-3f.)

- Parallel to Springlake Road/1500N (east and west of US 67). At this location, the project would be built roughly at-grade and changes to views from 15 homes along Springlake Road and 1500N would be small. (See Exhibit II-3g through Exhibit II-3j.)
- US 67 (north of Macomb) Interchange. At this location, the proposed alignment includes an interchange on what is flat farmland. The interchange would be adjacent to four homes. The project would displace two neighboring homes. The project includes a frontage road behind these homes. The presence of the bridge would substantially change views to the south for these homes. The interchange would replace views of their neighbors and surrounding farmland. The frontage road, although used only to serve these homes and provide access to farmland, would affect the privacy of back yards. (See Exhibit II-3h.)
- Bower Road/1400E. Here, the proposed alignment would cross Bower Road on a bridge approached on fill. Views of the fill and bridge would replace existing views of woods from three nearby homes. (See Exhibit II-3j.)
- 1400N. At this location, 1400N would pass over the proposed alignment on a bridge approached on fill in this area of flat, cultivated land. Views of farmland from a nearby home would be replaced by views of the bridge and fill and the proposed alignment, which would be roughly at ground level. The home is about 300 meters (1,000 feet) from the fill but adjacent to the bypass. (See Exhibit II-3l.)
- BNSF Railroad and University Drive/1300N. The proposed alignment would cross the BNSF Railroad and University Drive/1300N on bridges that are approached on fill. The project would replace views of farmlands to the west at one home. (See Exhibit II-3m.)
- US 136/US 67 (east of Macomb). The proposed alignment includes an interchange in this area. Existing US 136/1200N would be moved. Views from three homes in this area would change slightly. The interchange would be 500 meters (1,640 feet) from the nearest home. (See Exhibit II-3n.)

IV.N.4 Mitigation

As a part of habitat mitigation described in Section IV.H.3, the right-of-way of the proposed alignment would be planted in prairie grasses. This program would reduce the impact to the views from homes in the 1250N/Adams Street area. No other mitigation is proposed. The project would include a tree replacement program between 1250N/Adams Street and CH 14/1350N, but the program would not be in the viewshed of sensitive viewers.

IV.O SECONDARY AND CUMULATIVE IMPACTS

Secondary effects are those that are "...caused by an action and are later in time or further removed in distance but are still reasonably foreseeable" (Title 40, *Code of Federal Regulations*, Section 1508.8). One example is a new shopping center attracted to the vicinity of an intersection for a new highway. Cumulative effects are those "...impacts which result from the incremental consequences of an action when added to other past and reasonably foreseeable future actions" (Title 40, *Code of Federal Regulations*, Section 1508.7).

This assessment focuses on the area of potential traffic movement and development influence of the proposed highway, primarily Macomb and its immediate environs. Past trends in development and natural resource use in this study area were used to determine a probable or

reasonably foreseeable future environment. For most of the project area, natural resource characteristics are not expected to change substantially in the future. In general, woodland areas where the terrain is unsuitable for farming are susceptible to residential development and continued grazing. Some new development could occur. A limited amount of new development has occurred in the project area, however, as described in Section II.A.1, the population of McDonough County has been in decline. This trend is expected to reverse itself.

IV.O.1 Secondary Actions

Growth in development and the provision of associated infrastructure are the only actions expected because of the proposed highway that would cause secondary impacts in the Macomb area. Section IV.B.7 described the potential for the proposed highway to induce growth. In summary, the proposed highway would likely support current commercial, industrial and residential development trends. Commercial development should continue near the eastern and western ends of the proposed alignment. At the eastern end of the project, commercial development likely would be accelerated with the proposed highway, and would likely extend beyond its current limits at US 67. Similarly, the proposed highway could encourage commercial development near the western segment of the project. Residential development would continue in the northwestern and western portions of the project area. Implementation of the proposed highway could accelerate or increase this trend only to the extent that the project acts as a catalyst to attract jobs and thus increase the demand for new housing. Because the population of McDonough County has declined since 1990, any increases in population and employment in the county are not expected to be dramatic. US 67 is not likely to be a feature that is sufficiently attractive to counter the characteristics that make currently developing areas east and west of Macomb attractive and thereby shift substantial new development to the north of Macomb.

IV.O.2 Cumulative Actions

Cumulative actions include existing residential, commercial, industrial, agricultural, and infrastructure land uses. They also include anticipated and planned new growth defined in the previous section, as well as the proposed highway and other highway improvements connecting to the proposed highway.

IV.O.3 Community Impacts

The proposed highway would support area development goals. Current development patterns should differ only in rate and extent between the No-Action Alternative and the proposed highway. The location of development should not change substantially.

Enrollment at Western Illinois University has steadily increased over the past few years. The University has expanded its golf course to 18 holes. The University recently purchased a second farm for research purposes. As residential development continues in the western and northwestern areas of the project area, there is the potential that facilities of the University which are not contiguous with the main campus could become surrounded by development.

Expected and induced growth that could occur in the Macomb area is considered a benefit to the community. New industry would provide additional jobs in the area, helping to reverse the trend of a declining population. New industry also could increase the diversity of job opportunities in the area, which would provide additional incentives and opportunities for future generations to remain in Macomb, rather than seek employment in other areas. New industry also could increase the number and diversity of commercial businesses in the area.

IV.O.4 Agricultural Impacts

There are approximately 45.1 hectares (111.4 acres) of agricultural land (farm tracts) within one quarter kilometer (0.24 mile) of the interchanges of the proposed alignment. There are 705.4 hectares (1,741.7 acres) of agricultural land within one kilometer (0.94 mile) of the interchanges. In McDonough County, agricultural preservation zoning does not exist to protect agricultural lands from conversion to non-agricultural land uses. Also, there are no agricultural protection districts in McDonough County. Development, however, occurs and is expected to continue to occur in the predominantly wooded areas with undulating terrain that are west of Macomb. Development is also expected to occur in areas designated for industrial and commercial development near the US 136/US 67 interchange on the east side of Macomb. Active agricultural land predominates east of Macomb and any expansion of industrial and commercial development beyond currently designated areas, however, would use additional active agricultural lands.

IV.O.5 Natural Resource Impacts

Plant Communities

Forests and wetlands are interspersed among the tracts of farmland that dominate the project area. Along major drainages, wooded ravines associated with the East Fork of the La Moine River valley dissect agricultural lands. All vegetation cover types have been degraded to varying degrees because of the long history of land use (Hill, 1999). The potential for secondary impacts to sensitive or unique communities would be greatest north of the western US 136 interchange. Here large tracts of floodplain forest, upland forest, and wetlands are associated with the ravines and floodplains of the La Moine River. This area is attractive for residential development. The northeast and southeast quadrants at the US 67 interchange both have corridors of upland forest beginning approximately 800 meters (0.50 mile) from the interchange. New and induced development is less likely in this area. The southeast quadrant of the US 136/US 67 interchange has a pond and a small area of upland forest, both approximately 900 meters (0.56 mile) from the center of the interchange. This area could be affected if commercial and industrial development spreads east of the interchange.

Wetlands

Prior to settlement by European immigrants in the mid-19th century, wetlands were prominent in the Illinois landscape. Since that time, Illinois has lost approximately 85 percent of its wetlands habitat. The watershed of the East Fork of the La Moine River encompasses approximately 57,359 hectares (141,732 acres). Of this area, 1,334 hectares (3,298 acres) or only 2.3 percent is in wetland. Most remaining wetlands are in private ownership and thus subject to future development pressures.

Between the mid-19th and mid-20th centuries, the majority of wetland losses were a result of drainage programs and land improvements related to increased agricultural development. Losses during the past 25 years have been partially related to agricultural activities, urban growth in and around Macomb and highway projects. Since 1991, state sponsored road improvements have been proposed and/or constructed requiring impact to less than 5 hectares (12.4 acres) of wetland. These wetland losses have been mitigated through the creation and protection of new wetland habitats. While future wetland losses may occur, the total wetlands within the project area has become substantially stabilized by existing regulations and federal requirements for protection and mitigation.

IV.P CONSTRUCTION IMPACTS

During the construction phase of the proposed highway, the potential exists for short-term adverse impacts from construction equipment and activities. To mitigate those effects, the contractor would be required to adhere to the latest edition of the *Standard Specifications for Road and Bridge Construction*, IDOT's *Standard Specifications for Erosion and Sediment Control*, and IDOT's *Joint Design/Construction Procedures Memorandum on Erosion and Sediment Control*. Several management and design practices were and would continue to be incorporated into the proposed highway project to help minimize construction impacts.

IV.P.1 Agricultural Activities and Soils

The proposed highway parallels property lines where possible to minimize severances and maintain access to farm fields. Contractors will be required to implement sedimentation and erosion control measures to minimize loss of topsoil into streams and roadside ditches. They would maintain proper field drainage during construction. In addition to using the land-locked parcels for environmental mitigation, the areas currently in cropland or non-native grasses would be investigated for use as borrow areas. This could reduce impacts to additional agricultural areas during construction. During the construction of the proposed highway, **types of erosion control measures that could be used are:**

- **Use of stabilizing vegetation;**
- **Design of the freeway embankment with flatter slopes to reduce erosion potential, in addition to ditch benching of the slopes to reduce run-off rate;**
- **Use of sediment basins to trap sediment before it leaves the construction area;**
- **Use of ground stabilizers to prevent particle dislodgment which could include rip-rap or other man made materials;**
- **Use of temporary erosion control measures during construction, such as ditch checks, silt fences, erosion blankets, and seeding of disturbed areas;**
- **Clean fill for contractor access; and**
- **Diversion channels.**

Applicable measures to control soil erosion at drainageways and river crossings would include the following:

- **Ditch checks and sediment basins to reduce run-off velocity;**
- **Silt fences at the perimeter of embankments to contain sediment;**
- **Erosion control blankets on fore-slopes and back-slopes;**
- **Temporary seeding;**
- **Mulch;**
- **Flattened slopes;**

- **Ground stabilization by means of rip-rap or man-made materials; and**
- **Clean fill for contractor access or diversion channels.**

Erosion control measures also would be implemented throughout the project area in accordance with current IDOT policy as stated in the IDOT's *Joint Design/Construction Procedures Memorandum on Erosion and Sediment Control*. An erosion control plan specifying the erosion control features in detail would be prepared as part of the construction contract documents. A Section 404 Permit from the US Army Corps of Engineers would be required for applicable stream crossings, in addition to the Clean Water Act NPDES requirements.

Agricultural mitigation measures are also discussed in Section IV.C.7.

IV.P.2 Disruption of Services

Traffic flow would be maintained throughout construction by present routing wherever possible, and by alternate routing when construction activities necessitate a detour. It is expected delays because of construction would be minimal. Construction activities could temporarily affect traffic patterns as some drivers choose alternative routes to avoid the construction.

Short-term loss of business because of road construction is expected to be minimal. When a detour route around construction is necessary, minor detours would provide an alternate route, so disruptions in access to businesses would be kept to a minimum.

Construction of the proposed highway would require the relocation of some utilities in the project area. During the design phase, the IDOT would contact each municipality and utility company to coordinate provisions for the relocation, adjustment, or extension of their facilities, as needed to accommodate the proposed highway. Coordination of construction of the proposed highway with any planned service extensions would be sought in order to minimize utility service and traffic interruptions, as well as to minimize damage and repair to newly constructed pavements. (See Section IV.B.4.)

IV.P.3 Noise

During construction of the proposed highway, the potential exists for short-term noise impacts generated by construction equipment. To reduce the potential for such impacts, the IDOT would require contractors to adhere to the latest edition of the *Standard Specifications for Road and Bridge Construction*. (See Section IV.F.8.)

IV.P.4 Water Quality

Short-term construction impacts could result from the clearing of vegetation, mass grading, excavation and filling required for highway construction. These activities substantially increase the potential for soil erosion and could result in elevated turbidity levels in nearby surface waters. Water quality downstream from construction zones could experience increased nutrient levels, suspended solids, and lowered oxygen concentrations. Immediately downstream, violations of water quality standards could occur, but would be short-term. Suspended solids and related turbidity could affect the feeding and spawning of fish. These impacts would be the most severe immediately downstream of construction areas or direct discharge points and would dissipate with time, as well as distance downstream. The contractor would implement erosion and sediment controls as an integral part of the construction process in accordance with the IDOT's

Standard Specifications for Erosion and Sediment Control. Equipment would need to cross the East Fork of the La Moine River via a gravel causeway. Impacts to water quality would be short-term and limited to the effects of disturbed sediments and resulting turbidity created by the placement of clean gravel. (See Section IV.I.1.)

IV.P.5 Wetlands

Short-term impacts would occur at the east crossing of the East Fork La Moine River. Construction equipment would require access to locations where bridge piers would be constructed. These activities would result in soil compaction and disturbance to vegetation in defined access ways. Following construction, these areas would be restored.

IV.Q SUMMARY OF MITIGATION MEASURES

Section 101(b) of the National Environmental Policy Act (NEPA), requires that federal agencies incorporate into their project planning all practicable measures to mitigate adverse environmental impacts resulting from a proposed action. The following paragraphs summarize the mitigation commitments for the proposed project. Discussions that are more detailed are provided in the referenced sections. Final mitigation plans would be incorporated into final engineering plans and specifications prepared for the proposed highway.

IV.Q.1 Agriculture

The following management and design practices were and would continue to be incorporated into the proposed alignment to help minimize disruptions to agricultural activities and help limit adverse impacts to designated soils:

- Parallel property lines, where feasible, to keep farm severances, severance management zones and uneconomic remnants to a minimum.
- Construct field access roads to maintain access to farm fields.
- Maintain existing surface and subsurface drainage.
- Meet with the IDOA and local agricultural agencies to obtain firsthand knowledge and awareness of impacts.
- Implement sedimentation and erosion control measures to minimize loss of topsoil into streams and roadside ditches.
- Locate field tiles draining to or intersected by the proposed highway's right-of-way by trenching in order to ensure that proper field drainage is maintained during construction.
- Investigate **land-locked parcels for use as borrow areas.**

(See Section IV.C.7.)

IV.Q.2 Upland Habitat

Upland habitat loss would be mitigated as follows:

- **35.5** hectares (**87.6** acres) – prairie restoration.
- **14.0** hectares (**34.6** acres) – forest restoration.
- **60.8** hectares (**150.3** acres) – upland forest protected from grazing and development.
- 14.0 hectares (34.8 acres) – floodplain forest protected from grazing and development.
- 1.3 hectares (3.2 acres) – wetland protected from grazing and development.

(See Section IV.H.3.)

IV.Q.3 Vehicle/Animal Collision Mitigation

Twelve wildlife crossings are recommended for the proposed highway. Additional studies concerning animal movements will be conducted, if necessary, and the findings of possible future studies could result in changes in the number and locations of the wildlife crossings. (See Section IV.H.3.)

IV.Q.4 Threatened and Endangered Species

Implementation of the minimization and mitigation discussed in Section IV.H.3 could be beneficial to forest interior bird species, Henslow's sparrow, Bell's vireo, and the regal fritillary.

IV.Q.5 Wetlands

The total wetland loss requiring mitigation would be **0.76** hectare (**1.87** acres). A minimum of **2.79** hectares (**6.89** acres) of wetland compensation would be required. Wetland impacts would be compensated through the development of both forested and non-forested wetland. (See Section IV.K.5.)